

FLIGHT

The
AIRCRAFT ENGINEER
AND AIRSHIPS

Founded in 1909

FIRST AERONAUTICAL WEEKLY IN THE WORLD

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

No. 5100. Vol. XXVIII.

OCTOBER 24, 1935

Thursdays, Price 6d.
By Post, 7½d.

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1

Telegrams: Truditur, Sedist, London.

Telephone: Hop 3333 (50 lines).

HERTFORD ST.
COVENTRY.
Telegrams: Autocar, Coventry.
Telephone: Coventry 5210.

GUILDHALL BUILDINGS,
NAVIGATION ST., BIRMINGHAM. 2.
Telegrams: Autopress, Birmingham.
Telephone: Midland 2971.

260, DEANSGATE,
MANCHESTER. 3.
Telegrams: Hiffe, Manchester.
Telephone: Blackfriars 4412.

26B, RENFIELD ST.
GLASGOW, C.2.
Telegrams: Hiffe, Glasgow.
Telephone: Central 4857.

SUBSCRIPTION
RATES:

Home and Canada: Year, £1 13 0.
Other Countries: Year, £1 13 0.

6 months, 16s. 6d. 3 months, 8s. 3d.
6 months, 17s. 6d. 3 months, 8s. 9d.

Doubling Air Services

ONE of the healthiest signs of the times is the readiness of the great companies—Imperial Airways and their associated concerns—to duplicate services without receiving any additional subsidy. There was a time, and not so long ago, when any suggestion of flying a route without a subsidy was looked on as impossible. Recently, however, Imperial Airways have duplicated the northern services in Africa and those to Karachi, while in conjunction with Indian Trans-Continental Airways they have also duplicated those from Karachi to Singapore.

Now the allied Australian company, Qantas Empire Airways, is considering a duplication of the weekly service (in both directions) between Singapore and Brisbane. This, too, would presumably be without any subsidy. The benefit to Australia would be beyond doubt. It is an anomaly that mails for Australia should reach Singapore twice a week but that there should only be one delivery a week from there to Australia. The air services themselves gain in reputation and goodwill by offering facilities to the public, and, provided that such enterprises do not land the air companies in serious loss, such goodwill must ultimately mean profits and dividends for the air companies. That the companies can now afford to run services without subsidies shows that we are getting within an appreciable distance of the time when air transport will be self-supporting.

Qantas Empire Airways can see definite advantages in duplicating the weekly Brisbane-Singapore service, at any rate so far as the section between Brisbane and Darwin is concerned. The passenger who wants to travel from one part of Queensland to another has not been altogether a gainer by the advent of the trunk line from England. Through passengers have taken up a great proportion of the seats, and the mail has occupied space

that in the days of the old indigenous Qantas was available for internal Australian freight. The old Qantas was a very successful affair, and conferred very great boons on the vast grazing districts which it served. With the duplication of the service from Singapore, many of these former blessings will again become available to the settlers in the Outback, and their restoration will surely be heartily welcomed.

"Non-Placets" at Cambridge

PACIFISM unfortunately seems likely to become a sort of skin disease which drives its victims to constant scratchings of a most unpleasing nature. It has evidently affected certain Cambridge Dons, who smelt something savouring of militarism in Sir John Siddleley's generous gift of £10,000 to the University for aeronautical research. Gifts of that nature cannot be accepted by the University unless the Senate, the ruling body of the University, grants a Grace, and when a Grace is introduced, the members vote either "Placet" or "Non Placet." This Grace was introduced in the long vacation, and several members gave notice that they would vote "Non Placet" because they thought that the money was to be used to improve instruments of war. The skin disease must have been very virulent.

Dons often travel in the long vacation, either for pleasure or to increase their learning, sometimes for actual historical research. One would have thought it quite likely that members of the Cambridge Senate might have been sufficiently modern to have flown east of Karachi or south of Kisumu to view, say, the foot-steps of Alexander the Great in the Punjab or the mysterious ancient cities of Rhodesia. If they had, these Dons would have travelled in Armstrong-Whitworth Atalantas driven by Siddleley Cerval engines. They would doubtless have admired the excellent character-

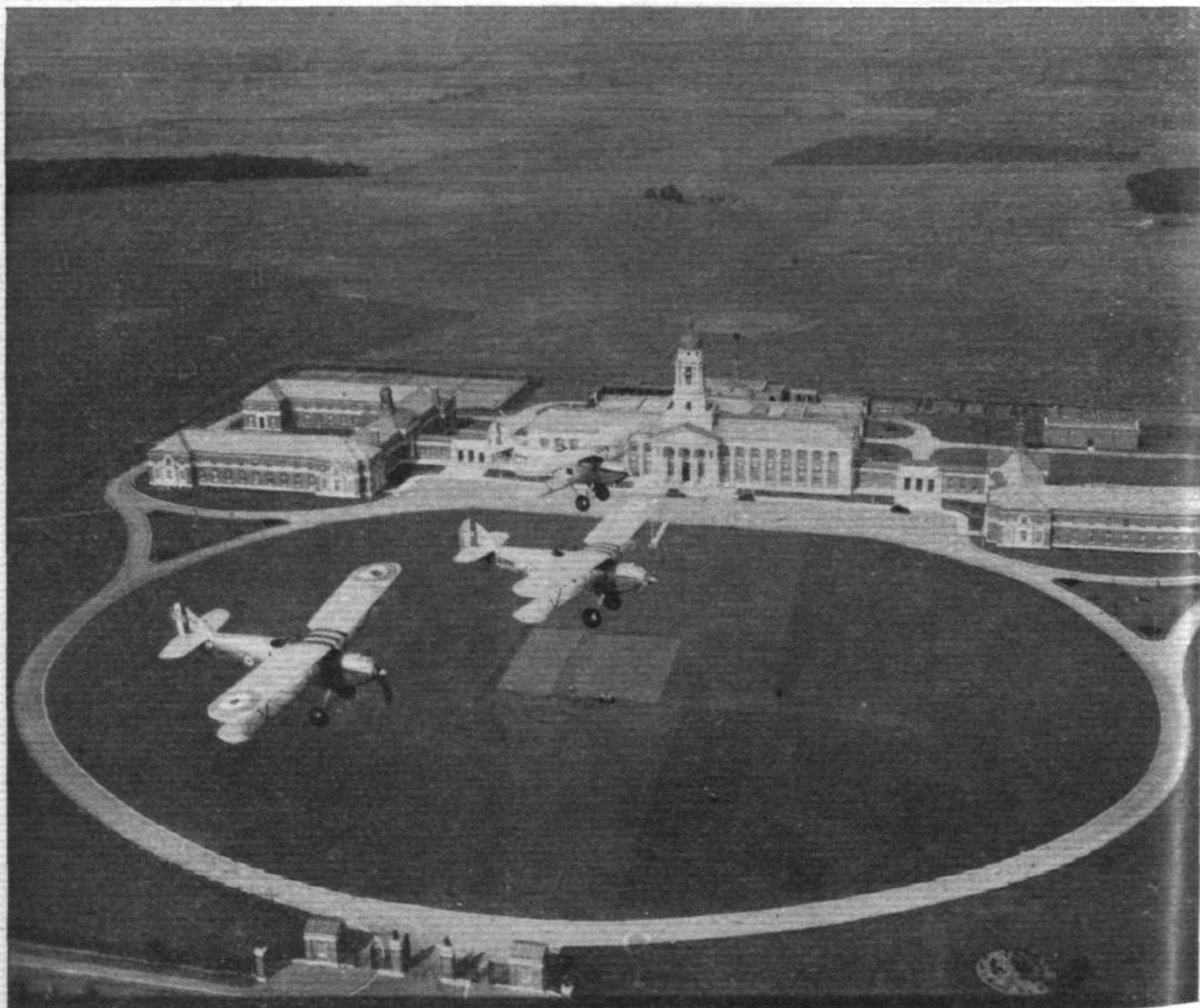
istics of both, but have thought, none the less, that it would be good work to make them even better. Such work, they might have gone on to reflect, would be well worthy of the dignity of Cambridge University. And, even supposing that none of the pacifist Dons had made such a trip, they ought certainly to have known something about the work being done by Imperial Airways. Evidently they were blankly ignorant of it, and thought that aeroplanes meant only bombers. Consequently, they proceeded to make the Congregation of Cambridge mildly ridiculous in the eyes of everybody.

Victory

Professor Melvill Jones must have felt it rather humiliating to have to explain to these learned ignorami that aeroplanes have a civil and a civilising purpose, though petrol-driven machines are also used in war. However, he was successful, and the Non-Placets withdrew their objections. The reputation of Cambridge for general knowledge and common sense was finally vindicated. We only hope that the pacifist Dons now have the grace to feel ashamed of themselves.

R.A.F. Engineering

THE question of having a branch of Engineer officers in the R.A.F., on the lines of the Navy, has been debated for years. The present system is that some General Duties officers specialise in engines, armament, etc., and then are given special engineering appointments for two years. One of these specialist officers has written a very persuasive article in the *Royal Air Force Quarterly*, in which he maintains that the system is wrong because it disregards the human factor. The specialist "E" officer, he says, is not sufficiently trained, has no incentive to do good work, and longs to get back to flying duties. In time of war he would certainly go back, and civilians would be employed for engineer duties. The writer overlooks the fact that recently some warrant officers have been promoted as Commissioned Engineer Officers, which may be the thin end of a wedge. The important thing is that the engineer officer should be a good organiser, but if he can be also an expert at his subject, so much the better. The recent innovation may lead up to that ideal.



CRANWELL : A fine aerial impression of Hawker Harts flying over the R.A.F. Cadet College at Cranwell. In common with that of other R.A.F. centres, the work of the College has been considerably increased by the expansion. Not only are flight cadets turned out as permanent officers, but university candidates for commissions go through a course there.

The Outlook

A Running Commentary on Air Topics

Flying Fitness

BY virtue of a little effective prompting a great many pilots and others were prevailed upon to air their views after Major Brackley's lecture, a résumé of which is given on pages 432-434, and a number of interesting criticisms and suggestions were made.

Not the least important point raised concerned the standard of physical fitness necessary for transport pilots, and the general consensus of opinion appeared to suggest that sheer fitness ought to take second place in the case of a pilot with a vast flying experience. We have always felt that good men may often be turned down by a medical board for some quite trivial defects while still in full possession of all the faculties necessary for safe commercial flying.

The real difficulty, of course, concerns the international agreements, by which a certain fixed standard of physical perfection must be maintained by all commercial pilots flying on international routes. Meanwhile, it is encouraging to learn that, once past a danger period, a pilot is likely to remain as fit as the medical boards expect until quite an impressive age; so we should be able to retain the services of our Master Pilots for many years to come. Flying is no longer considered to be only a young man's business.

The Automatic Pilot

SOME very mixed views were expressed about the value or otherwise of the automatic pilot, and the suggestion was made that it might economically be fitted to very large machines.

This appears to be rather begging the question. Surely in the case of very large machines, in which a captain, a first officer, a radio operator and, perhaps, a navigator are carried, the need for an automatic pilot is extremely small. Provided that its weight can be kept down, its real value would be that of relieving the pilot in the case of smaller machines on which the crew is restricted to two or even to one person.

A six/seven-seater with a built-in automatic pilot could be comfortably handled by a single pilot, who would be able with its help to give all his attention to his radio and to navigation, and the operating costs would accordingly be reduced.

The objections raised to its use mainly concerned an alleged jerkiness in action. Surely this is a matter of design and application and does not in any way affect the value of the automatic pilot in principle. The best-known examples, incidentally, are adjustable for "fierceness" in all axes, and it must not be forgotten that they are in regular use on a great number of air lines.

Instrument-flying Training

THE question of instrument-flying training is an important one, complicated at present by the fact that different instruments are in use. Whereas training is carried out with a plain turn and bank indicator, the majority of transport machines are fitted with artificial horizons and directional gyros.

Admittedly, the major part of the training in blind flying

concerns the establishment, in a pilot's mind, of a fixed and unalterable belief in instruments as such, and in cases of real emergency a pilot might still find it necessary to fall back on his turn indicator, which registers in all possible attitudes.

Nevertheless, instrument flying in big machines while in actual service might be considered in the future as an essential part of a Second Pilot's training. The passengers need not be told that the machine is being flown by a Second Pilot who is surrounded by curtains!

Straws

THAT the era of the large flying boat is dawning has already become quite clear. A number of aircraft of this class are being built by Short Brothers for Imperial Airways. In America the Sikorsky and Martin boats are undergoing thorough operational tests, and a British firm has secured the British building rights for the Sikorsky. Pan American Airways have put up to the New Zealand Government a proposal for a weekly flying boat service between California and Auckland, New Zealand, and it has been reported, although not confirmed, that Mr. Plesman, of the K.L.M., who is at present in the United States, has discussed plans for a linking-up of his company's route when the trans-Pacific route of Pan American Airways is in operation. Sir Kingsford Smith's presence at flying tests of the Sikorsky recently has been connected up with the possibility of Sikorsky boats being used on an Australia-New Zealand service.

Political considerations seem likely to delay matters somewhat, the British Government very rightly holding that British mails should travel in British aircraft, but doubtless some *quid pro quo* will be discovered which will enable any difficulties of this nature to be smoothed out. In the meantime, it is highly satisfactory to know that technical progress has been such that services of such an ambitious nature can be contemplated.

A Ticklish Question

THE "N.R." licence granted by the American Department of Commerce may be regarded as a *carte blanche* for the designers of highly loaded record-breakers and tricky racers. It will not be denied, however, that it has done a great deal to stimulate individual thought and effort in the production of such machines.

Reports from America speaking of Wiley Post's and Will Roger's ill-starred hybrid Lockheed say that the installation of the geared Wasp instead of the direct-drive model usual in Altairs and Orions had shifted the C. of G. so far forward that the machine had to be landed with power. Post, in fact, is believed to have told another pilot that should the engine ever fail he would crash, and experts maintain that when the machine was fully loaded barely any factor of safety remained.

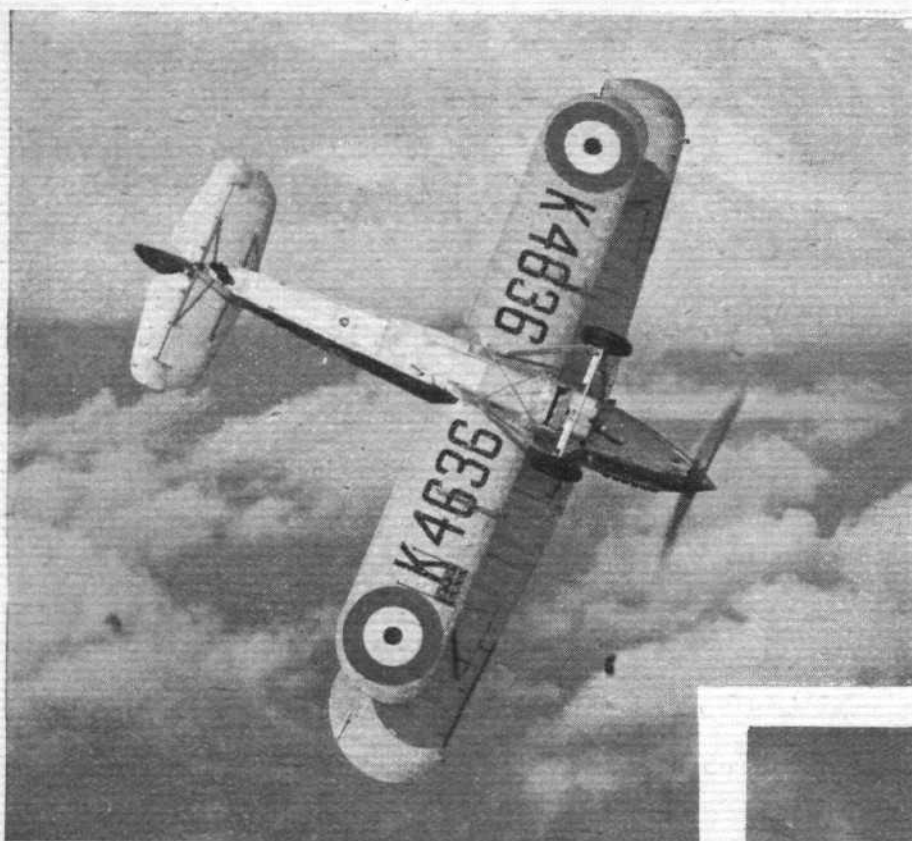
The constructors of the engine and aircraft need shoulder no blame for the accident.

It seems that the question which arises is this: In view of the stimulus which doubtless can be conferred by the "N.R." licence, will a radical tightening up of licensing regulations kill an unwarrantable amount of that enterprise with which American aviation has become identified?

DIVE

The Technique of a Modern and Deadly Method of Attack on a Land or Sea Target : Some Facts and Figures from America : The Human Element

By H. F. KING



Going Down : An R.A.F. Hind (Kestrel V) light bomber and (below) a Pegasus-Hart for Sweden, demonstrate how dive bombers enter their dives. Sweden, incidentally is employing her Harts very extensively for dive bombing. (Flight photographs.)

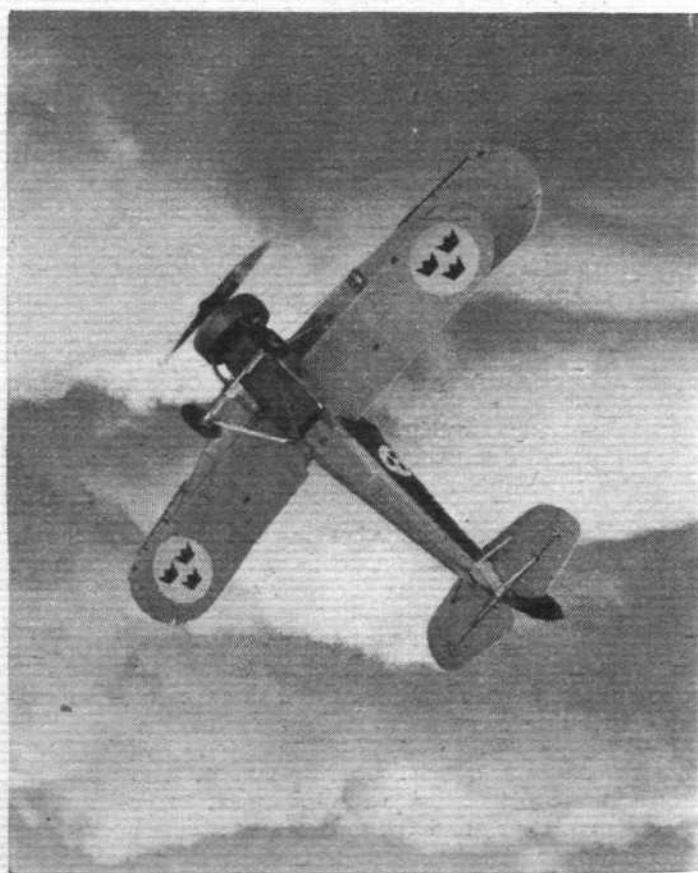
ONE of the most spectacular, and at the same time effective, methods of attack associated with modern warfare is that in which bombing aeroplanes, in order to secure accurate results under certain conditions, are aimed bodily at their target, releasing their projectiles in a steep dive.

Naturally, the British Air Ministry is unwilling to disclose information on dive bombing, as practised by various units of the R.A.F., which might be turned to good account by some foreign power in time of war, but, in view of the increasingly wide employment of such tactics by air services throughout the world, some explanation of the elementary principles involved may not be out of place.

Dive bombing, of course, is by no means an innovation : the germ of the idea was present during the war when fighters were used to *strafe* troops and trenches with light fragmentation bombs. Not until more recent years, however, was it possible to release comparatively heavy bomb loads in steep dives. It has been found that, in certain circumstances, the diving attack can prove itself greatly superior to the horizontal method of bombing.

Broadly speaking, the theory behind dive bombing is similar to that of fixed gunnery, the whole machine being aimed at the target. The attacking aircraft approaches the latter in a steep dive at, say, 60 degrees, often from 12,000 or 15,000 ft. At, perhaps, 3,000 ft. (the length of the dive and the height of the pull-out vary, of course, with the type of aeroplane concerned) the bombs are released, not, as is popularly supposed, when the machine is pointing directly at its target, but a few degrees nearer the horizontal. Were this not the case the bombs would fall short of their objective owing to gravity, which would tend to draw them from their original course.

Contrary to a general belief, the ability to make dive bombing attacks is not confined to the comparatively small single-engined machines. Provision is made, for example, in the later types of Boulton Paul medium bombers for the internally stowed bombs to fall clear of the structure when



released in a dive. Before long we may see even heavier types equipped for dive bombing.

There is no doubt that the majority of the new experimental light bombers which are being built for the R.A.F. will have provision for internal bomb stowage. Some form of mechanical "arm" may consequently be required in certain cases to hold the bombs clear of the fuselage for a diving attack.

The method of approach of a dive bomber varies with the condition of the sky, and various schemes have been evolved for taking advantage of clouds to surprise the enemy. It is greatly advantageous, of course, to dive "out of the sun" in order to increase the difficulty of the task of the "Archie" gunner—trying enough in any circumstances with the target literally dropping out of the sky at about 300 m.p.h. The speed accumulated during the dive will assist, to a great extent, in carrying it out of

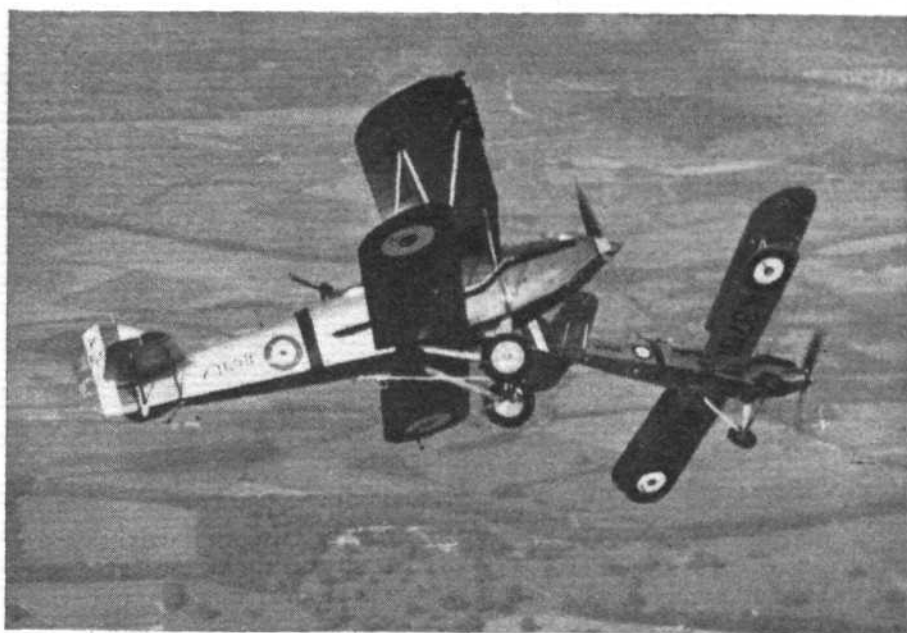
BOMBING

"Archie" range after the pull-out.

One of the greatest enemies of the dive bomber in time of war, when attacking a naval vessel (for the diving attack is particularly effective against warships), is likely to be the multiple pom-pom quick-firing gun, which is virtually a number of pom-poms on a common mounting. Such a weapon fires somewhere in the neighbourhood of a ton of small high explosive shells in a minute.

Dive bombing attacks are delivered by single machines and by formations. Perhaps the most widely employed method is for a squadron or flight to approach its target in stepped-up echelon formation, the machines breaking away one by one and wheeling over into their dive on the tail of the lowest machine.

Some years ago when the famous Curtiss Helldivers entered service with the U.S. Navy there was popularised what the Americans were pleased to call the split dive. Eighteen Helldivers would approach a warship in formation. Then, when nearly over their target, the first nine machines would separate into three threes, wheel over into a steep dive, and approach the vessel from three directions, crossing each others' paths at the bottom of their dives in somewhat terrifying proximity. Before the naval gunners had a chance to recover from their nerve-racking experience, the second nine machines of the Helldiver unit would repeat the manoeuvre. It was held to be enough to shatter the morale of, and put off his aim, the most hardened gunner in the service.



Two Hawker Audax army co-operation biplanes wheeling over into a dive. In time of war A.C. machines might employ dive-bombing tactics against such ground targets as machine gun nests. (*Flight* photograph.)

The old Helldivers did much to bring dive bombing into the eye of the American public (and, for that matter, the British) when a film was made centring round their exploits. They were classed, actually, as two-seater fighters, having two front guns and one free gun. To-day they are obsolescent and, apparently, are used mainly for training.

The U.S. Navy, in fact, appears to have altered its policy somewhat, and dive bombing duties are undertaken mostly by single-seater fighters and by larger and heavier two-seaters which do not possess the manoeuvrability to place them in the fighter category.

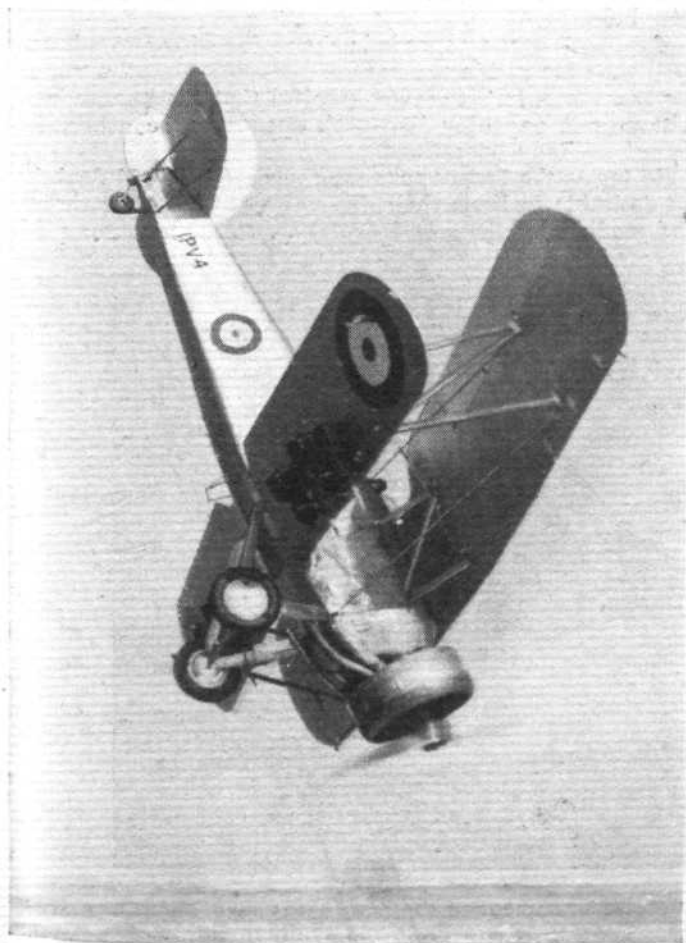
Pull-out Requirements

Extremely severe requirements for pull-outs from dives are imposed by the U.S.N. on its machines, leading a writer in an American contemporary to express himself as follows: "We are told that in one of these sharp pull-outs from a terminal velocity dive, to meet the current rigid Navy requirements, a pilot is absolutely without control as to the amount or force of pull-out he puts on a ship, as the only physical or mental reaction possible under these circumstances is to decide when he is going to pull out, pray, pull like hell, pass out, and hope that when he does come to he and the airplane will still be intact." He goes on to say that it is not enough for those who object to some of the Navy specifications to point out that the man in the Navy who writes them, and is sincere in his belief that he is doing the proper thing to establish them, has himself never been through a terminal velocity dive and pull-out.

The physical strain imposed on the crews of dive bombers can, of course, become excessive if the pull-out is made too rapidly. Ear drums, too, may suffer from the rapid change in pressure experienced during the dive. There are those who maintain that the strain of a dive is lessened if one shouts loudly all the way down. Personally, one confesses to having experienced a strong urge to yell in such circumstances for some obscure psychological reason.

During preliminary training, a dive from, say, 15,000 ft., is divided into a number of "steps," each of 2,000 or 3,000 ft., the final dive usually being started between 5,000 and 6,000 ft.

Under high-speed diving conditions the airscrew, of course, will windmill the crankshaft round far beyond its



The Hawker P.V.4 biplane (Pegasus X) is a recent type in the design of which dive bombing has been a primary consideration. (*Flight* photograph.)

One of the original Wasp-engined Curtiss Helldivers of the type seen in the film which derived its title from this machine.

approved number of r.p.m., resulting in a relative increase in the dynamic loadings and stresses of various vital components of, perhaps, more than 70 per cent.

Manufacturers of engines intended for installation in Service machines which might be subjected to such dives are now designing their products to meet these conditions.

For some years past the U.S. Navy has had in service several Martin 125 dive bombers. The manufacturers of this machine, which now, of course, is obsolescent, claimed that it was the first type capable of carrying a 1,000 lb. bomb in a terminal velocity dive, and recovering from the dive without dropping the bomb. During the preliminary tests at the Naval Air Station, Anacostia, the machine first dived from 10,500 ft. without a bomb, then made two dives of about 4,500ft. with an empty bomb case, reaching about 253 m.p.h., and, finally, a dive from 12,000 ft. to 6,000 ft. with a 1,000 lb. bomb in a standard release. With the bomb in position the machine is capable of all normal aerobatics, including loops, rolls, Immelman turns and inverted flying. The terminal velocity speed is about 260 m.p.h. The basic aerodynamic design was prepared by the Bureau of Aeronautics of the U.S. Navy, but the Glenn L. Martin Company was responsible for the construction.

During recent months the U.S. Navy has been holding a competition with a view to selecting a new type of dive bomber. The Consolidated and Great Lakes concerns among others, have entries. There are rumours of a new Douglas machine, also in this category.

With the introduction of very fast fighters into the U.S. Navy a new class of machine has been formed. The fairly large and more or less conventional single-seaters are now termed bomber-fighters, and several have been posted to units which formerly had two-seaters for dive-bombing duties. Typical of these machines is the Curtiss BF2C-1, as employed from the new aircraft-carrier *Ranger*. This machine is said to be equipped for the carriage of nearly 500 lb. of bombs, which may be released at any angle in the dive up to, and including, the vertical. The small Boeing single-seater Navy fighters of the F4B series are similarly employed for light dive bombing work, being



equipped to carry two 116 lb. bombs. There is an instance on record of one of these machines diving from 18,000 ft., releasing its bombs, and landing—all in 2 min. 25 sec.

In the R.A.F. there is very definitely no paucity of types suited to dive bombing. All members of the extensive Hawker two-seater family, of course, fill the bill admirably. The heavier general-purpose type are also employed for the work, and in the Fleet Air Arm the sturdy torpedo bombers and Blackburn and Fairey T.S.R.s are capable of handling very large bomb loads in a dive.

All the Hawker two-seater types are capable of diving up to speeds of over 300 m.p.h. Such speeds, in fact, are approached by the machines when engaged in dive bombing operations. The single-seater types have a terminal velocity of something like 100 m.p.h. higher.

Lately the Air Ministry appears to have developed something of a "craze" for dive bombing. The majority of the new general-purpose machines are stressed for the work, mainly, one suspects, with an eye on coastal defence. One, the Hawker P.V.4 biplane, specialises in dive bombing, and is reputed to carry a heavier bomb load than do the specialised light bombers.

Terminal velocity speeds in the region of 500 m.p.h. may be looked for within the next few months from light bombing machines, but it seems doubtful that the human factor will permit anything like such speeds to be attained in actual military operations.

So far as the large types are concerned, it will doubtless be desirable to limit their diving speeds, possibly through the medium of flaps or infinitely variable airscrew pitch.



A single 1,000 lb. bomb slung below the fuselage is the main offensive armament of the Martin 125 dive bomber, a type which has been produced in quantity for the U.S. Navy. The engine is a Pratt and Whitney Hornet.

THE MILAN SHOW

Some Interesting Exhibits, and Plenty of Record Breakers, but Comparatively Little Real Novelty



The types of machines on show at the Milan Exhibition range from light trainers to heavy bombers and transports. Record breakers form an exhibition in themselves. In the foreground of this general view there is the big Savoia S.73 triple-engined transport monoplane.

THE moment chosen for Italy's First International Aircraft Exhibition (writes an Italian correspondent) can hardly be considered as propitious, for her workshops have been for a long time engaged to capacity in preparation for her war in Abyssinia. It must, however, be recognised that the result, as a show, could hardly be bettered.

For the venue the huge Palazzo dello Sport, Milan, has been chosen; it gives a floor area, along with two vast annexes, of 28,000 sq. yards. In addition, of course, to Italy, four nations are showing officially: France, Germany, Russia and Poland. The other countries are: England (Rudge Whitworth and Ferodo), America, Belgium, Czechoslovakia, Estonia, Finland, Lettonia, Norway, Sweden and Switzerland.

A marble slab surmounted by an eagle has been placed on the wall to record the feat of Léon Délagrange, who, in 1908, was the first to fly a heavier-than-air craft in Milan, over the spot where the Palazzo stands now.

Three Record Breakers

The Italian Ministry are showing three record-breaking machines: Agello's 440 m.p.h. M.C.72, Stoppani's Cant. Z.501 (Monfalcone-Berbera), and Donati's Ca.137, which attained an altitude of 47,300 ft. Both the last-named have been altered for military purposes. Dominating the whole of one end is an impressive-looking Savoia-Marchetti S.81 bomber, fitted with three 600 h.p. Piaggio-Stella engines. The wing span is 24m. (78ft. 9in.); area 92 sq. m. (990 sq. ft.); maximum and cruising speeds nearly 400 and 320 km./hr. (248 and 198 m.p.h.) respectively; maximum load, 6 tons; climb to 6,000 m. (19,700ft.), 21 min.; range, 1,600 miles; armament, seven machine guns, two 1,760lb. "torpedoes," six 220lb. bombs, and four 440lb. bombs. Parts of the covering have been removed to show bomb stowage.

Near by is the Jona 6, described in last week's *Flight*.

Another Italian novelty is the Fratelli Nardi (F.N.305), a low-wing cantilever two-seater with a laterally retractable undercarriage which can be lowered in eight seconds; it is extremely trim and graceful. With a load of 300 kg. (660lb.), and fitted with a Gipsy Six engine, it easily attains 350 km./hr. (217 m.p.h.). Engineer Nardi expects his new highly streamlined cabin machine to top the 400 km./hr. (250 m.p.h.) mark. The Breda 28, specially built for the military aerobatic and fighter school, is a two-seater biplane with a welded steel tube fuselage covered with fabric. Among its characteristics are: wing span, 10m. (32.8ft.); lifting surface, 30 sq. m. (323 sq. ft.), total weight, 1,200 kg. (2,640lb.); cruising speed, 200 k.p.h. (124 m.p.h.).

Two single-seater fighters worthy of note are the C.R.41 and C.R.32. The former is engined with a Fiat A.58, air-cooled, and is capable of 440 km./hr. (275 m.p.h.), while the latter is fitted with a water-cooled A.30 R.A. and can attain 380 km./hr. (236 m.p.h.). Both are heavily armed. The Ro.37 (Industria Aeronautica Romeo, Naples) is a two-seater scout fitted with a Fiat A.30 R.A. developing 600 h.p. It has a wing span of 11.08 m. (36.3ft.); lifting surface, 32 sq. m. (345 sq. ft.); useful load, 835 kg. (1,840lb.); weight, 2,235 kg. (4,920lb.); speed, 319/341 km./hr. (198-212 m.p.h., according to altitude); range, 2,000 km. (1,240 miles).

A roomy transport machine is the low-wing Savoia Marchetti S.73. It has three Gnome 600 h.p. engines, can comfortably do 330 km./hr. (205 m.p.h.), and is unsinkable in water. An interesting point is the ease with which the wings can be unshipped and fitted.

In one of the side halls one sees the familiar Caproni 123. Hard by is the new P.S.I. touring model monoplane. Fitted with a radial engine, it can attain 245 km./hr. (152 m.p.h.). The Borea is a small civil monoplane having two engines, one in each wing.

Passing to the last hall, we are immediately faced by the all-metal G.18, a cantilever low-wing monoplane with retractable undercarriage and variable-pitch three-bladed airscrew; the useful load is 2,650 kg. (5,830 lb.), and speed, 330 km./hr. (205 m.p.h.). Here, too, are the Cant Z.1010 four-seater with Alfa Romeo 110 engine, giving a cruising speed of 180 km./hr. (112 m.p.h.); the Augusta B.6; the Piaggio 16 bomber; two touring models, the SAI I. and SAI II; and the Lictor two-seater 130, a low-wing monoplane.

In the side halls France shows all her leading types, but only in the form of models, which, however, make a very effective exhibition. There is one notable exception—the Caudron 460, winner of the Deutsch Cup. The French Air Ministry stand occupies one-half of one of the side halls, and is most attractive.

In the central hall, France displays boldly. Another Caudron 460 with 370 h.p. Renault engine is shown, and alongside is a formidable list of the records which it holds. Then there is a Caudron Simoun fitted with Bengali 180 h.p. engine. Towering aloft, as if in defiance of the Marchetti S.81 at the other end of the hall, is a huge Potez 54 bomber, with three gun turrets. There are also a Dewoitine 501 all-metal mono-

plane fighter with Hispano-Suiza engine; a Mureaux 117 fighter, a Potez 6, Dewoitine D.333 bomber, and others.

Germany, too, has a comprehensive show—a two-seater Bücker Jungmann 131 monoplane with a 280 h.p. Hirth engine; a Gotha 145; a Klemm 35, Hirth engine; and suspended above all is the *San Paolo*. The stand has a ring of models, the most interesting of which represent the Dornier 18 and Dornier 7. The D.L.H. display facts and figures illustrating their work.

Poland shows the Wojskowe Warsztaty baloon with which she has won the Gordon Bennett Cup outright. Alongside is the P.Z.L. four-gun fighter. There is also a P.Z.L. Gr.760 radial engine.

Near by is the American Fairchild 24. The price is 5,500 dollars, which, translated into lire, makes the natives gasp. There are many engines and accessories, but there is really nothing fresh. The only new engine is the Perfetti eighteen-cylinder rotary—6 litre, 110 h.p., weight 84 kg. (185 lb.).

Since Italians are far from being air-minded the attendance up to the present has hardly been satisfactory, and this in spite of the fact that the charge to enter is only eightpence. The show remains open until next Monday.

MAN-POWER FLIGHT

Pix © Karl Wisselbach, Frankfurt 9 M.

PROBABLY man has dreamed of being able to fly by his own efforts ever since he first became aware of birds in the sky above him. Technicians are divided on the subject, some holding that man is unable to fly by his own power, others that in a very efficient and lightly constructed machine he should be able to do so, at least for a short time.

Some years ago a prize of 5,000 marks was offered in Germany for the first man to make a circular flight around two points 500 metres apart, using only his own power to propel him through the air. The conditions of the competition permitted some form of energy storage to be used, but stipulated that it should be carried during the flight. For example, a compressed-air container might be used to



The nose of the *Muskelflugzeug*, showing the rubber-cord "energy accumulator" drum.

drive the airscrew, but the pilot himself, without outside aid, would have to pump up the container before the start of the flight.

Two young German engineers, Haessler and Villinger, attacked the problem in a different way, and used a rubber cable as the "accumulator." Their machine is very like an ordinary glider in outward appearance, but inside the nose of the fuselage is placed a large spool on which a rubber cable is wound, this cable, on being stretched around the spool, supplying power to an airscrew placed above the wing of the glider.

The machine, which has a wing span of 44 ft., is extremely light, weighing but 77 lb. without the rubber cord "accumulator," and 110 lb. with it.

A German pilot, Herr Dünnebeil, after thorough physical training, succeeded some time ago in making several flights in the machine, some of them of more than 200 yards in length and up to 22 seconds' duration.

Although he failed to win the prize of 5,000 marks, Dünnebeil was awarded a consolation prize of 3,000 marks, while the two constructors had placed at their disposal a sum of 3,000 marks for further development work.

Fritz Wittekind.



The one-man-power aeroplane in flight.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

Panamarican

A new type of flying boat belonging to the U.S. Navy arrived at Alameda, California, last Tuesday, having flown from Colon, Panama, a distance of 3,300 miles, non-stop, in 34 hr. 51 min.

Trans-Tasman Temerity

In defiance of the authorities, who had suspended his airworthiness certificate, Mr. M. O'Hara, it is reported, recently flew from Richmond (N.S.W.) in a B.A. Eagle across the Tasman sea to New Zealand, a distance of 1,400 miles.

"Baby Clipper" Goes Exploring

A special Fairchild "Baby Clipper" amphibian (760 h.p. Wright Cyclone), generally similar to the Fairchilds used by Pan-American Airways on river routes of its international system, is to be used by Mr. Richard Archbold, an associate of the American Museum of Natural History, for an expedition into New Guinea. Included in the equipment is a chute for the delivery of supplies to ground survey parties by means of parachutes, and an aerial mapping camera.

Twenty-five Years Ago

(From "Flight" of October 22, 1910)

"Germany, having discovered that at last Britain has an efficient aeroplane and is therefore likely to become a dangerous Power, decides to attack London by dirigibles before Britain has time to build machines. Justin goes forth to tackle with his single aeroplane no fewer than 90 Zeppelins. His encounter with them over the North Sea makes quite exciting reading."

—(From a book review.)

The Brancker Memorial Lecture

The first of the Brancker memorial lectures will be delivered by Lt.-Col. F. C. Shelmerdine, Director General of Civil Aviation, next Wednesday, October 30, at 6 p.m., in the Lecture Theatre of the Institute of Electrical Engineers, Victoria Embankment, London. His subject will be "Air Transport in Great Britain—Some Problems and Needs." Admission is unrestricted.

Merciful Measures

An unofficial "army" of 5,500 "air defenders" has been sworn in at Munich. It is composed of citizens aged between 14 and 65 who have completed courses in treatment for gas poisoning, in fire extinction, and the control of mass-hysteria.

The President of the F.A.I., Prince Bibesco, is negotiating with the International Red Cross Committee to determine the best way for private airmen to assist in first-aid work in Abyssinia.



ABOVE THE BATTERY. The new Pratt and Whitney Hornet-engined Burnelli transport tests its split flaps during a test flight over New York.

One Thousand Heinkels

The Heinkel works at Rostock, Germany, have just completed its 1,000th aeroplane in thirteen years.



A COMMUTING SHIP—or what we should know as a business man's aeroplane, is the Boeing 247D of the American Phillips Petroleum Company. Here an official of that company is seen using an inter-phone R/T set to talk to ground wireless stations. The equipment can be used, in addition, for communication between the cabin and the pilots' compartment.

One, Two and Three Up

A Soviet airwoman, Margarita Ratsenskaya, has kept aloft in a new type of glider for 15 hr. 39 min. V. Lisitzyn, with a passenger, has managed to keep his two-seater glider up for 38 hr. 40 min. Another enthusiast, supposedly of the Soviet, accompanied by a pair of friends, has done 11 hr. 30 min.

Facts Right, Conclusions Otherwise

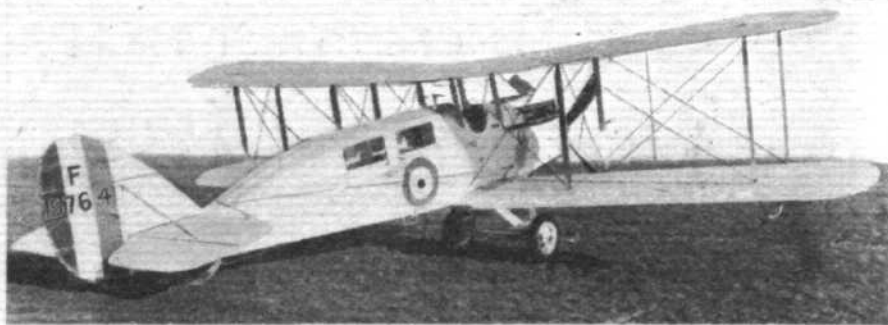
From a daily paper's description of a "Mystery British 'Q' ship of the air": "Sliding hatches hide the cockpits of the gunners, and a gun . . . can be made to vanish in two or three seconds, revealing no trace of the airplane's fighting equipment." It is disappointing that there was not a row of dummy passengers, wearing bowler hats, to complete the story.

"Schneiderish" Loading

Mr. Mulligan, the high-wing Pratt and Whitney Wasp-powered racing monoplane which won the Thompson Trophy Race and the Bendix Transcontinental Dash this year, took off from Burbank for the latter event with a wing loading of 39.1 lb./sq. ft. It may be recalled that the Supermarine S6B was loaded to just over 41 lb./sq. ft. Mr. Mulligan, incidentally, will do 287 m.p.h. "through the gate" at sea level, and has been dived to an indicated air speed of 435 m.p.h. A "private owner" development of Mr. Mulligan is being built.

PILOTING COMMERCIAL AIRCRAFT

The Pilot's Problems and Some Methods of Solution : Instrument Flying : Conditions Peculiar to the Empire Routes : A Précis of Major Brackley's R.Ae.S. Lecture



The D.H.4A was the first British "commercial" aeroplane. It was a converted military machine. (Flight photograph.)

THE problems encountered by the commercial aircraft pilot were discussed at the first lecture of the session before the Royal Aeronautical Society last Monday evening. The lecture was delivered by Major H. G. Brackley, D.S.O., D.S.C., F.R.G.S., and Lt.-Col. J. T. C. Moore-Brabazon, President of the Society, was in the chair.

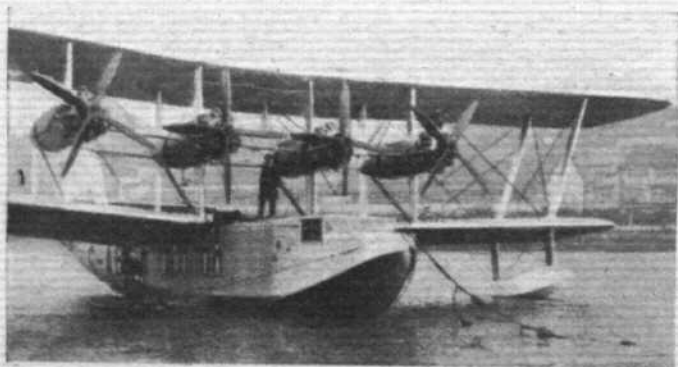
Major Brackley pointed out that commercial flying differed considerably from military and private flying, and that the classes of flying tended to diverge.

After outlining the crude beginnings of commercial flying, the lecturer paid a tribute to the early commercial pilots, who had few of the extraneous aids now available. Men such as F. L. Barnard, Foot, Hinchliffe, Minchin and Powell set a very high standard and a very fine example. Those of the original band who were still flying, and whose hours at the controls exceeded 10,000, were increasing the prestige of British aviation.

In 1924, when the four then existing companies were amalgamated into Imperial Airways, the single-engined types which had done magnificent pioneer work gave way almost entirely to multi-engined types. Comfort and better aids to navigation were introduced, and Imperial Airways started the system of having a captain and a first officer on all large machines.

Turning to the aircraft in use to-day, the lecturer stated that it was essential to have machines which were stable on three axes and did not need constant correction to keep them on their course. A clear view from the pilot's seat forward, to the sides, and downwards was essential, and sliding panels should be so placed that they did not admit rain and wind. Major Brackley said he would like to see all control cabins heated.

The grouping of instruments on the panel was very important. It should be such that the pilot had an unrestricted view and did not have constantly to re-focus his eyes. Indirect lighting, rheostat-controlled, was essential.



A modern British flying boat, the Short "Kent" with four Bristol Jupiter engines, is used on the Mediterranean section of the Empire air route. (Flight photograph.)

Although present-day instruments were very reliable, air-speed indicators still went out of action when flying in heavy rain.

Major Brackley thought the automatic pilot would be valuable when still larger aircraft were produced. Its present shortcomings were its cost and weight, and the necessity to design the control layout specially to take the stresses. Pilotage in fog conditions called for more skill than did any other form of navigation. Most of Imperial's captains had learned their fog and cloud flying by the aid of turn and bank indicators. It was only during the last two years that those two excellent instruments, the artificial horizon and the directional gyro, had been added to all their aircraft.

There were, the lecturer said, plenty of junior pilots who could not keep their machines straight, simply because they could not concentrate on their instruments. When they entered clouds, they braced up rigidly in a state of nervous tension. An experienced pilot relaxed himself when flying by instruments.

Most training schools in England trained pilots in instrument flying "under the hood" with turn and bank indicator, generally in good weather conditions. If more instruction could be given in actual clouds, the pupil would benefit considerably. He might be taught "under the hood" first, and the second part of the training should be done in cloud.

Transport companies had found difficulty in obtaining pilots qualified in instrument flying, and when the new pilots joined they were usually surprised at the bad weather conditions in which the more experienced pilots were able to fly.

Flying-boat Operation

Concerning boat operation the lecturer had a good deal to say. Alighting at night was effected along a paraffin flare path of six floating flares. A landing light was used from the aircraft, but often a slight mist over the water destroyed its usefulness. It was, however, invaluable while taxiing. In congested harbours the flying boat was preceded by a motor launch, which carried two light blue lights, easily distinguished from other lights.

Piloting commercial aircraft on desert routes called for physical fitness. Long hours had to be spent at the controls, and the change from the cool air at altitude to the furnace-like heat on the ground was very trying.

In the southern half of the African air route special consideration had to be given to the altitude and dimensions of the aerodrome. Those situated at 4,000ft. or 5,000ft. above sea level had to be treated with respect. Captains of Imperial Airways treated the *haboobs* of the Sudan with the greatest respect. If one was met it was best either to fly around it or to try to get over it. Fortunately, these *haboobs* did not usually extend above 5,000ft.

Night flying was generally associated with calm con-

ditions. But for that, captains would find difficulty in operating over long distances above unlighted and uninhabited country. A difficult section lay between Kisumu on Victoria Nyanza and Juba in the Sudan. Violent storms might occur any evening throughout the year, making wireless communication unreliable. The section from Juba to Atbara, north of Khartoum, also presented the same difficulty during the rainy season. Pilots would welcome aerial beacons every 100 miles; at present these only existed at a few landing grounds. At most aerodromes floodlights were provided, and the conventional paraffin flares arranged in the form of an "L" with the shortest arm facing the wind.

When attempting to reach an aerodrome in a sandstorm particular care had to be taken. There were two safe methods of approach. The first was by flying low over a known course and losing altitude to about 600ft., when the ground could usually be seen, provided there was horizontal visibility of about 300 yards, and by following tracks, rivers, etc., to the aerodrome. The second method was to fly on a wireless bearing until over the aerodrome and then lose height until the ground could be seen. With that method the visibility should not be less than 800 yards, because wireless communication was often unreliable, due to static interference. It was advisable not to continue or start on a flight when the visibility at the destination was less than 300 yards. Familiarity with obstructions was essential, since the great difficulty in landing during sandstorms occurred when, having flown over the aerodrome in one direction, it was necessary to turn and land in the opposite direction after the aerodrome had disappeared from sight. During sandstorms aircraft become highly charged with static electricity, and great care must be exercised when refuelling.

The Eastern Section

Between Karachi, Singapore and Darwin, the year could be divided into the two monsoons, the north-east and south-west monsoons for the Karachi-Singapore section, and the north-west and south-east monsoons for the Singapore-Australian section. During the north-east monsoon piloting over the Karachi-Singapore route was a comparatively easy matter, as the weather was mainly fine as far as Southern Siam. Dust storms might be encountered over the Sind Desert at this period, but they were not, as a rule, very dense. Morning and evening fogs occurred at most aerodromes from November to February. Generally speaking the fogs were shallow. Conditions for night flying were good during this period, but there were few intermediate beacons, and landmarks by night were scarce. Night flying had to be mainly by dead reckoning with checks by wireless bearings. The latter could not be relied upon, because most of the stations on the route had equipment which was subject to "night error."

Across India before and after the south-west monsoon, when hot weather was experienced with strong westerly to south-westerly winds increasing with height, the captain was faced with the problem of deciding whether he would remain low and in disturbed hot air of about 115 deg. temperature, or fly high into cooler and calmer air and face a head wind of about 50 to 60 m.p.h.

In the south-west monsoon, piloting was a very different

matter and considerable skill was required to keep to schedule. During this time practically the whole route was covered with low cloud, and rain was constant over one sector or another. All high ground was usually in the clouds and much instrument flying had to be done. It was then that difficulties arose. Owing to the presence of low cloud and rain very few pilot balloon ascents could be made, and the upper winds could only be estimated from the synoptic chart. Direction finding positions were not easy to obtain when flying in heavy tropical storms in turbulent conditions which made it difficult to keep a straight course.

Cumulus clouds over high ground frequently reached a height of over 15,000ft., and when flying in that section vertical currents were encountered. Revolving storms were common in the Bay of Bengal, and it was almost impossible to pass through them. Even in the middle of the south-west monsoon period, however, it was sometimes possible to fly in sunshine above the clouds at between ten and fifteen thousand feet.

Weather data east of Sourabaya were scarce. Owing to the presence of volcanic mountains, over 7,000ft. high, masses of cumulus cloud formed over the land, producing violent thunderstorms and rainstorms. This usually occurred in the evening.

Over the Timor Sea

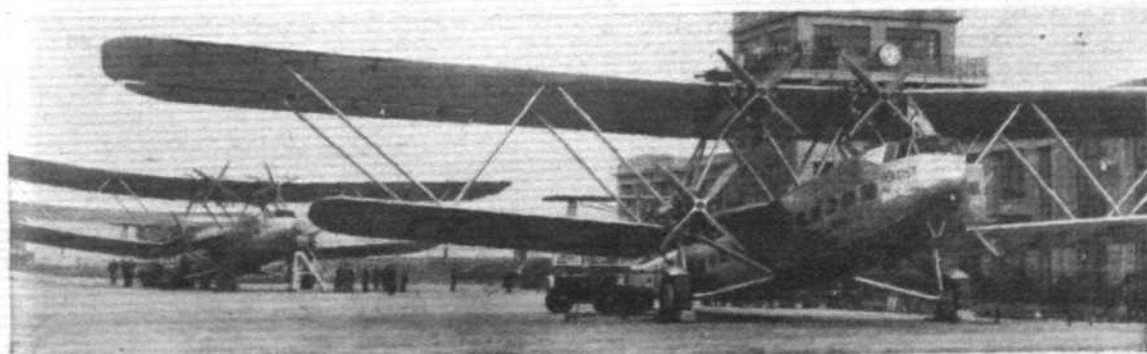
The final sector of the route to Australia was over some 500 miles of open sea, where navigation had to be entirely by dead reckoning, with the possibility of "homing" on Darwin. Upper-wind data were required on this last section because it was possible to get a following wind in both directions if one chose to fly high.

Practically over the whole Singapore-Darwin route the upper winds varied with altitude. This also applied to other parts of the Empire routes such as Lower Egypt and from Sudan to the Equator. The change of wind direction with altitude was of great commercial importance. Frequently, between Khartoum and the Equator, when a strong southerly wind was blowing at lower levels, a light to moderate north-easterly was available above 7,000ft. When there was a strong northerly wind over the ground comparative calm prevailed above 7,000 to 8,000ft.

In concluding his lecture, Major Brackley said that it was at one time thought that the business life of a commercial pilot would be comparatively short. Experience was causing this view to be modified, and there were already captains in Imperial Airways who had to their credit over 10,000 flying hours and whose physical condition suggested that they were fit to continue for many years to come. With an actual mileage on the European and Imperial services of close on 4,000,000 miles and a regulated percentage of completed scheduled flights of well over 95, Major Brackley thought the captains and crews of Imperial Airways might well be proud of their record.

THE DISCUSSION

IN opening the discussion, Mr. E. C. Gordon England, after congratulating Major Brackley, asked whether the idea of "conditioned air" in an otherwise hermetically sealed cockpit would not be a good one. Alluding to the automatic pilot—which was to become something of a bone of contention during the questionnaire—he wanted to know the mini-



The Handley Page "Hannibal" class, the first really large British commercial aeroplane, set a new standard in comfort for passengers. (Flight photograph.)

imum size of machine to which such an instrument might reasonably be fitted.

More important were his questions concerning fog safety—with the possibility of the development of a "proximity signal"—and the problem of natural stability when flying blind. Should a pilot attempt to correct every little deviation when he knew that the particular machine would recover itself? He also asked whether anything could be done to prevent reflections at night from the airscrew disc.

Finally, Mr. Gordon England suggested that sheer medical fitness was not of paramount importance nowadays, but was secondary to sheer experience for commercial pilots.

Mr. Stanley Evans, the assistant designer of the Heston Aircraft Company, asked whether de-icer development was being seriously considered in this country.

That a light and efficient automatic pilot should be fitted to all commercial machines in order to relieve the pilot was Lord Sempill's opening suggestion. He asked whether completely duplicated blind-flying instruments should not be fitted, whether Imperial Airways had had experience with sensitive altimeters, and how fog-landing development was progressing.

Capt. F. Dismore, of Imperial Airways, dared to suggest that the minimum limit of visibility in certain conditions, given by Major Brackley as 300 yards, was on the short side! He should know.

Mr. H. E. Wimperis, who had just returned from the Italian conference on stratosphere flying, asked two very pointed questions: Which blind landing system did Major Brackley consider to be the best, and what would he demand in such a system if none had so far been developed? Alluding to the conference, he explained that the scientists spoke in terms of 60,000 feet and 1,200 m.p.h.! A new prime mover he said, would need to be developed before such heights and speeds were within the realm of possibility.

As a stratospheric "expert," Flt. Lt. C. F. Uwins, chief test pilot of the Bristol Aeroplane Company, was asked to make a contribution to the discussion. He did not believe that the stratosphere would be used for many years to come, and suggested that the method of instrument flying training was quite wrong inasmuch as artificial horizons were now used for serious blind flying in commercial machines. With such instruments the machine should never reach an aerobatic attitude, and the need for a turn indicator was, therefore, non-existent. He suggested that one pilot should be hooded in big commercial machines so that experience could be gained under operating conditions and over actual routes.

Capt. A. S. Wilcockson, of Imperial Airways, looking very fit despite the Brussels incident, spoke of the lag experienced between instrument indication and recovery in big machines, and explained that experience was needed to fly comfortably by instrument in such circumstances. Pilots, he thought, should be taught instrument flying in each machine used by an operating company.

After explaining his difficulty in obtaining a speaker as busy and far-travelling as Major Brackley, Major R. H. Mayo said that the paper brought out the fact that the status of the commercial pilot had entirely changed. He visualised

the day when an aircraft captain would not touch the controls, but would have the responsibility of making decisions, busying himself with navigation and with the passengers' comfort.

Capt. H. W. Perry, of Imperial Airways, suggested that the automatic pilot was not necessary for short flights, and believed firmly in the good psychological effect on the passengers when they felt that a human pilot was at the controls.

Mr. Hughes, of instrument fame, asked for the percentage of "bad" radio bearings obtained in commercial aviation, and explained his preference for the particular automatic pilot which had been developed at Farnborough and which is to be manufactured by Smith's Aircraft Instruments.

Major Brackley Replies

Replying briefly and efficiently to a very large number of questions Major Brackley explained that the problem of the heating of control cabins was being studied in the new machines for the Imperial fleet and reminded Mr. Gordon England of the fact that it was difficult to keep the windscreen clear when internal and external temperatures differed. Referring to the automatic pilot, he said that machines and, particularly, control layouts must be designed for this instrument. He found that automatic pilots tended to give jerky movements, and that passengers preferred the human pilot. He mentioned that a form of "proximity signal," giving other machines' height and position, was, in fact, being developed by Dr. Robinson, and that dull black airscrews would probably overcome reflection troubles. Concerning the fitness of commercial pilots, he agreed that this was not now of paramount importance, but that the pilot must still be able to withstand considerable changes of pressure and temperature.

It was difficult, he said, to fit de-icers to the present fleet, but felt that the future would see considerable developments. All the instruments in the new machines would be duplicated for the two pilots.

Concerning blind landing methods, he considered that the German Lorenz short-wave system (described in *Flight* of February 14) was the most satisfactory, and was already installed at many aerodromes in Europe. The system, he thought, should be as simple as possible for the pilot. Imperial Airways had already experimented with the system of training pilots in instrument flying in the actual machines used. There was, he said, a high percentage of good D/F bearings, but the ground control always, when in any doubt, gave such bearings as "second-class." He was prepared to believe that the Farnborough automatic pilot was an excellent one, but would be glad to see a few on the market.

In thanking the lecturer, Lt.-Col. J. T. C. Moore-Brabazon stressed the relative lack of available meteorological knowledge. While an eclipse could be predicted for A.D. 2035, the meteorologists could not tell him whether to take an umbrella out with him! He was pleased to learn that physical fitness did not noticeably decrease with advancing years.

He claimed that stratosphere flying would be doubly welcome if it necessitated the development of a new prime mover. Flying in thirty years' time, he said, would be as unlike flying to-day as this was unlike the flying of thirty years ago.



FOR THE IRRAWADDY FLOTILLA COMPANY: The first of the new Short Scion Seniors (four Pobjoy Niagaras) on the sliway at Rochester. The machine bears Australian registration letters. (*Flight* photograph.)

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS



AIR MINISTRY ANNOUNCEMENTS

R.A.F. STAFF COLLEGE

The following officers have been nominated by their respective Dominion Air Boards to attend the R.A.F. Staff Course, 1935:—

ROYAL AUSTRALIAN AIR FORCE: Flt. Lts. A. L. Walters and P. M. Rickard.

ROYAL CANADIAN AIR FORCE: Sqdn. Ldr. S. G. Tackaberry and Flt. Lt. B. G. Carr-Harris.

MOVE OF Nos. 9 (B) AND 214 (B) SQUADRONS

Nos. 9 (B) and 214 (B) Squadrons are moving from Boscombe Down to Andover, remaining under the command of the A.O.C., Western Area. The move commenced on October 15.

NOMENCLATURE OF AIRCRAFT

Shark aeroplanes now in construction have main planes, tail unit, fuselage and engine mounting of greater strength than those of the Shark aeroplanes first delivered to the service, and will be fitted with Tiger VI engines. This latter form of Shark will be designated Shark II and the earlier form will in future be designated Shark I.

UNIVERSITY COMMISSIONS

The undermentioned University candidates have been appointed to permanent commissions in the General Duties Branch of the Royal Air Force, with the rank of Pilot Officer:—

T. F. Barker (Oxford), J. C. Bevan (Wales), B. H. Boon (Cambridge), G. G. Cornwall (Cambridge), D. M. H. Craven (Reading), L. D. Dadswell (London), J. R. A. Embling (Oxford), A. R. Fane de Salis (Cambridge), N. Fisher (Cambridge), A. Foord-Kelcey (Cambridge), G. W. Peel (Cambridge), A. B. Rae (Oxford), B. J. R. Roberts (Cambridge), K. B. F. Smith (Oxford), F. W. Thompson (Liverpool), T. N. K. Walker (Cambridge), W. P. Whitworth (Cambridge).

FLYING ACCIDENT

The Air Ministry regrets to announce that P/O. Nevil Fisher, of the R.A.F. College, Cranwell, lost his life in an aircraft accident which occurred at Brauncewell on Thursday last. P/O. Fisher was the pilot and sole occupant of the aircraft.

NOMENCLATURE OF ENGINES

Officially named the Pegasus II M.2, a new engine of the Pegasus series differing from the Pegasus II M.3 only in the airscrew reduction gear ratio and minor details is being introduced into the Service. The rating and other particulars are as follows:—B.H.P.—590/580 at 5,000 ft. at 2,000 r.p.m. Airscrew reduction gear ratio—0.66 to 1.

Another new engine being introduced into the Service is the Armstrong Siddeley Tiger VI. It is of the air-cooled radial, 14-cylinder, double-row type, moderately supercharged, and is a development of the Tiger IV engine, but is intended for use with fuel of 87 octane number (Specification D.T.D. 230).

The rating and other particulars are as follows:—B.H.P.—730/760 at 5,000 ft. at 2,150 r.p.m. Compression ratio—6.2 to 1.

SHORT SERVICE OFFICERS—REVISED CONDITIONS

The conditions governing the grant of short service commissions in the general duties branch have been revised for officers commissioned on and after July 1, 1935, and are outlined in the succeeding paragraphs. The conditions of service of officers granted short service commissions before that date are in no way affected.

Age.—Candidates, at the date on which their applications are made, must be not less than 17½ years of age and have not attained their 25th birthday. For qualified pilots of the Royal Air Force Reserve, the Special Reserve and the Auxiliary Air Force, the upper age limit will be extended by one year.

Period of Appointment.—Appointments will be for a period of four years' service on the active list (including the time spent at a civil school), followed by six years on the reserve. Extensions of the active list period may be approved at the discretion of the Air Council.

Rank, etc.—Short service officers will be commissioned in the rank of acting pilot officer on probation from the date of joining the R.A.F. Depot, Uxbridge. Provided they have satisfactorily completed their training and are recommended as being likely to make efficient officers in all respects, they will be confirmed in their appointment and graded as pilot officers after twelve months' service (including the period spent at a civil school). Officers who have had previous training and are posted to service squadrons direct or after a shortened course at a flying training school will be graded as pilot officers from the date on which they join for duty at a service squadron, remaining on probation until they have completed twelve months' service.

Promotion to Flying Officer.—Pilot officers will be eligible to take Promotion Examination A after completing twelve months' service as such, and, subject to their having passed that examination and to their service having been satisfactory in all respects, their promotion to the rank of flying officer will normally take effect from the date of completion of 18-21 months' service from the date of grading as pilot officer, the actual date depending on the marks they obtain on passing out of the flying training school. Officers who are qualified pilots on entry and who do not pass out of a flying training school will be eligible for promotion to the rank of flying officer after eighteen months' service from the date of grading as a pilot officer. The promotion of pilot officers who have not passed the promotion examination by the date on which they become eligible for promotion will normally take effect from the date of passing the examination. Officers who obtain exceptionally high marks in the passing out examination at the flying training school may be exempted from the promotion examination for flying officer.

Command and Precedence.—Acting pilot officers will be junior to all pilot officers, but apart from this will, for the purpose of rank and command, be on exactly the same basis as other officers of the Royal Air Force.

Pay and Allowances at Civil Schools.—Whilst at a civil training school pay will be at the rate of 16s. 6d. a day inclusive from the date of joining the school. No emoluments in kind will be issued.

Gratuity.—Officers transferred to the reserve after completing their full period of service on the active list will be paid a gratuity at the rate of £100 for each completed year of actual service on full pay after the first; e.g. an officer transferred to the reserve after completing four years' service will be eligible for a gratuity of £400.

Medium Service.—Appointments to medium service from among officers granted short service commissions will, as heretofore, be for five years on the active list from the termination of the active list period of their short service engagement, followed by four years in the reserve. On transfer to the reserve on completion of their full period of medium service, they will receive gratuity additional to that in respect of the short service period at the rate of £100 for each year of medium service.

Permanent Commissions.—A strictly limited number of appointments to permanent commissions will, as heretofore, be available to short service officers.

A.M. Pamphlet 13 is in course of amendment and should be referred to for detailed information on the scheme outlined in this order.

ROYAL AIR FORCE GAZETTE

London Gazette, October 15, 1935

General Duties Branch

The following Flying Officers are granted permanent commissions in this rank (October 10):—A. A. Adams, J. A. B. Begg.

The following are granted permanent commissions as Pilot Officers on probation with effect from October 1 and with seniority of the dates stated:—J. C. Bevan, G. W. Peel, A. B. Rae, K. B. F. Smith,

F. W. Thompson (January 1, 1934); T. F. Barker, B. H. Boon, G. G. Cornwall, D. M. H. Craven, L. D. Dadswell, J. R. A. Embling, A. R. Fane de Salis, N. Fisher, A. Foord-Kelcey, B. J. R. Roberts, T. N. K. Walker (July 1, 1934); W. P. Whitworth (July 2).

The following are granted short service commissions as Acting Pilot Officers on probation with effect from and with seniority of September 30.—A. S. Amslie, C. D. Beaumont, J. R. I. Bell,

B. G. L. Betbeder, R. Cluer, W. A. L. Davis, J. N. W. Farmer, G. E. Ford, J. H. Greswell, P. J. Halford, J. D. Harris, R. G. Ker-Ramsay, R. N. Lambert, A. W. Lee, G. Lowe, V. E. Marshall, G. F. W. Morrison, W. G. Moseby, M. G. F. Pedley, R. A. G. Petrie, K. Slater, D. C. Smythe, F. G. R. Thomas, G. Thomas, J. G. Towle, J. W. B. Vernon, E. N. Wakelin, G. M. Wyatt.

Lt. R. Legg (1st Battn., The King's Own Scottish Borderers) is granted a temporary commission as Flying Officer on being re-seconded for duty with the Royal Air Force with effect from October 1 and with seniority of October 1, 1931. The notification in the *Gazette* of October 9, 1934, regarding Lt. H. D. Barlow, R.N., Flying Officer R.A.F., is cancelled.

The following are re-attached to the R.A.F. with effect from the dates stated:—(September 16).—Lt. Comdr. A. Brock, R.N.; Seniority as Flight Lieutenant January 1, 1933. Lt. O. S. Stevinson, R.N.; Seniority as Flying Officer January 23, 1928. Lt. J. A. D. Wroughton, R.N.; Seniority as Flight Lieutenant July 1. (September 17).—Lt. Comdr. J. H. F. Burroughs, R.N.; Seniority as Flight Lieutenant July 1, 1931. Lt. P. W. Humphreys, R.N.; Seniority as Flight Lieutenant April 1. (September 18).—Lt. Comdr. J. H. McI. Malcolm, R.N.; Seniority as Flying Officer January 12, 1930. Lt. G. B. S. Slater, R.N.; Seniority as Flight Lieutenant July 1.

Lt. H. D. Barlow, R.N., is reattached to the R.A.F. as a Flight Lieutenant with effect from September 17, and relinquishes his temporary commission on return to Naval duty (September 27). Acting Pilot Officer on probation C. N. Swann is confirmed in rank and graded as Pilot Officer (September 14). F/O. W. A. Richardson is promoted to the rank of Flight Lieutenant (September 14).

The following Pilot Officers are promoted to the rank of Flying Officer:—G. P. Seymour-Price (September 24); G. T. Toland (October 3).

Lt. (now Lt. Comdr.) J. H. McI. Malcolm, R.N., Flying Officer, R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (October 6, 1934). (Substituted for the notification in the *Gazette* of October 30, 1934); Sqn. Ldr. H. W. St. John, D.F.C., is placed on the retired list (October 14).

The following Flying Officers are transferred to the Reserve class A (October 10):—A. E. Clouston, J. N. Dufort, F. R. Newell, R. A. Phillips, J. G. Younghusband.

Accountant Branch

F/O. H. A. Frost is promoted to the rank of Flight Lieutenant (September 9).

Commissioned Signals Officer

Flying Officer on probation R. K. Nicholas is confirmed in rank (July 20).

Commissioned Armament Officer

Warrant Officer J. Heffernan is granted a permanent commission as Flying Officer on probation with effect from September 30, and with seniority of September 19.

Miscellaneous

L. H. Starr is granted a temporary commission as Flight Lieutenant for duty under the Director of the Meteorological Office (October 14).

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

W. D. Brookes is granted a commission as Pilot Officer in Class C (September 25).

The following Flying Officers are promoted to the rank of Flight Lieutenant (October 2):—E. R. Meads, F. R. Jones.

Pilot Officer on probation B. H. Boon relinquishes his commission on appointment to a permanent commission in the Royal Air Force (October 1); F/O. D. G. P. Fitzpatrick resigns his commission (August 12).

Medical Branch

D. F. E. Nash, M.R.C.S., L.R.C.P., is granted a commission as Flying Officer in Class DD (October 1).

SPECIAL RESERVE

General Duties Branch

Pilot Officer on probation B. J. R. Roberts relinquishes his commission on appointment to a permanent commission in the Royal Air Force (October 1).

AUXILIARY AIR FORCE

General Duties Branch

No. 604 (COUNTY OF MIDDLESEX) (FIGHTER) SQUADRON.—P/O. A. R. Fane de Salis relinquishes his commission on appointment to a permanent commission in the Royal Air Force (October 1).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Squadron Leaders.—C. S. Richardson, M.B.E., to Headquarters, R.A.F., India, New Delhi; for duty as Chief Signals Officer vice Sqn. Ldr. D. H. de Burgh, A.F.C., 3.10.35. C. P. Brown, D.F.C., to No. 26 (A.C.) Squadron, Catterick; to command vice Sqn. Ldr. C. H. Stilwell, 5.10.35. C. H. Stilwell, to No. 22 Group Headquarters, South Farnborough; for Air Staff duties, 8.10.35.

Flight Lieutenants.—T. B. Cooper, to R.A.F. Station, Singapore, 27.9.35. M. V. Delap, to Headquarters, R.A.F., Far East, Singapore, 27.9.35. R. C. Keary, to No. 36 (T.B.) Squadron, Singapore, 27.9.35. J. Norwood, to No. 28 (A.C.) Squadron, Ambala, India, 9.9.35. G. R. O'Sullivan, to No. 27 (B) Squadron, Kohat, India, 9.9.35. W. L. Freebody, to No. 803 (F.F.) Squadron, 27.9.35. J. G. Elton, A.F.C., to R.A.F. Station, Gosport, 4.10.35. U. Y. Shannon, to No. 99 (B) Squadron, Mildenhall, 7.10.35. V. S. Bowling, to No. 6 Flying Training School, Netheravon, 7.10.35. A. E. Case, to No. 1 School of Technical Training (Apprentices), Halton, 7.10.35. N. A. Pearce, to No. 11 Flying Training School, Wittering, 7.10.35.

Flying Officer.—R. Legg, to No. 1 Flying Training School, Leuchars; on appointment to a Temporary Commission, 30.9.35.

Acting Pilot Officers.—The undermentioned are posted to No. 3 Flying Training School, Grantham, with effect from 28.9.35:—J. Adam, K. L. Ashfold, R. S. Blake, H. Budden, E. P. Chapman, J. Culliford, A. C. Douglas, B. L. Evans, G. C. K. George, R. D. C. Gibson, H. S. Giddings, G. E. Hollings, C. B. Hull, D. H. C. Hull, L. L. Hunt, R. G. Hurst, D. A. V. John, C. E. Johnson, G. D. Jones, B. P. King, M. J. Loudon, D. J. McGlinn, M. H. T. Mellish, G. S. Milligan, W. H. R. Newton-Howes, R. H. Niven, A. E. Pringle, M. L. Robinson, K. M. Sclanders, H. W. A. Sheahan, W. J. L. Stevenson, P. E. A. Talbot, P. A. Tipping, R. R. S. Tuck, J. H. Van. A. W. Fletcher, to No. 5 Flying Training School, Sealand, 28.9.35.

The undermentioned are posted to the Royal Air Force Depot, Uxbridge, on appointment to short service commissions as Acting Pilot Officers on probation with effect from 7.10.35:—G. B. Andrews, J. L. Atkinson, J. Barrett, D. R. Biggs, N. M. Boffee, P. T. Bozman, J. B. Burnett, L. R. Field, J. Foulsham, P. A. Gilchrist, H. D. Green, G. F. Hall, P. P. Hanks, P. J. H. Harrington, F. Harrison, P. W. Hartley, G. L. B. Hull, T. M. Hunt, E. G. Jones, C. E. Levitt, R. D. More, B. G. D. Nathan, F. J. Norris, W. M. Penman, C. L. C. Roberts, P. F. Rutter, J. H. Sindall, W. O. L. Smith, P. G. D. Taylor, R. N. Todd-White, D. G. Warren, A. E. Williamson, D. B. M. Wright, and R. P. S. Wyrill. A. J. F. Churchill, H. R. Larkin, J. M. M. Thompson, to No. 9 (B) Squadron, Boscombe Down, 14.10.35. F. S. D. Burgis, R. M. Elms, H. T. Sutton, to No. 16 (A.C.) Squadron, Old Sarum, 14.10.35. M. P. C. Corkery,

T. A. N. Forsyth, M. S. C. Hymans, T. S. Jameson, M. M. Kane, A. E. Saunders, K. M. M. Wasse, A. J. Young, to No. 18 (B) Squadron, Bircham Newton, 14.10.35. A. C. Brown, G. W. P. Derbyshire, D. C. York, to No. 26 (A.C.) Squadron, Catterick, 14.10.35. A. G. G. Baird, R. N. Cook, R. I. K. Edwards, C. F. Herington, R. H. S. King, J. R. Maling, F. L. Newall, P. Stevens, to No. 57 (B) Squadron, Upper Heyford, 14.10.35. C. F. King, to No. 58 (B) Squadron, Worthy Down, 14.10.35.

Stores Branch

Squadron Leader.—E. L. Ridley, to Headquarters, R.A.F., Far East, Singapore; for Equipment (Stores) Staff duties vice Sqn. Ldr. A. G. Knight, M.B.E., 27.9.35.

Flying Officer.—E. G. Ambridge, to No. 203 (F.B.) Squadron, Basrah, Iraq, 18.9.35.

Accountant Branch

Wing Commander.—H. F. Fuller, to Headquarters, R.A.F., Far East, Singapore; for duty as Command Accountant vice Sqn. Ldr. E. J. Groat, 5.10.35.

Medical Branch

Flying Officers.—G. H. Stuart, to R.A.F. Station, Singapore, 27.9.35. R. A. Cumming, to Medical Training Depot, Halton; on appointment to a Short Service Commission, 1.10.35.

Dental Branch

Flying Officer.—D. P. Boyle, to No. 1 School of Technical Training (Apprentices), Halton, 14.10.35.

Commissioned Engineer Officers

Flying Officers.—The undermentioned are posted to the Units shown on appointment to Permanent Commissions as Flying Officers—Commissioned Engineer Officers—(on probation) with effect from 19.9.35:—S. W. Birch, to No. 3 School of Technical Training (Mech.), Manston, 19.9.35. M. Downer, to Home Aircraft Depot, Henlow, 19.9.35. T. Griffiths, to No. 1 School of Technical Training (Apprentices), Halton, 19.9.35. E. J. A. Knight, to No. 1 School of Technical Training (Apprentices), Halton, 19.9.35. J. H. Tuckey, to R.A.F. Station, Mount Batten, 19.9.35.

Commissioned Armament Officers

Flying Officer.—J. Heffernan, to R.A.F. Station, Boscombe Down; on appointment to a Permanent Commission as Flying Officer—Commissioned Armament Officer (on probation), 30.9.35.

Commissioned Signals Officers

Flying Officer.—P. Allerston, to School of Naval Co-operation, Lee-on-the-Solent, 7.10.35.

THE HESTON PHCENIX

*A New Five-seater With
an Unusually Roomy Cabin
Layout and Pleasant
Flying Qualities*



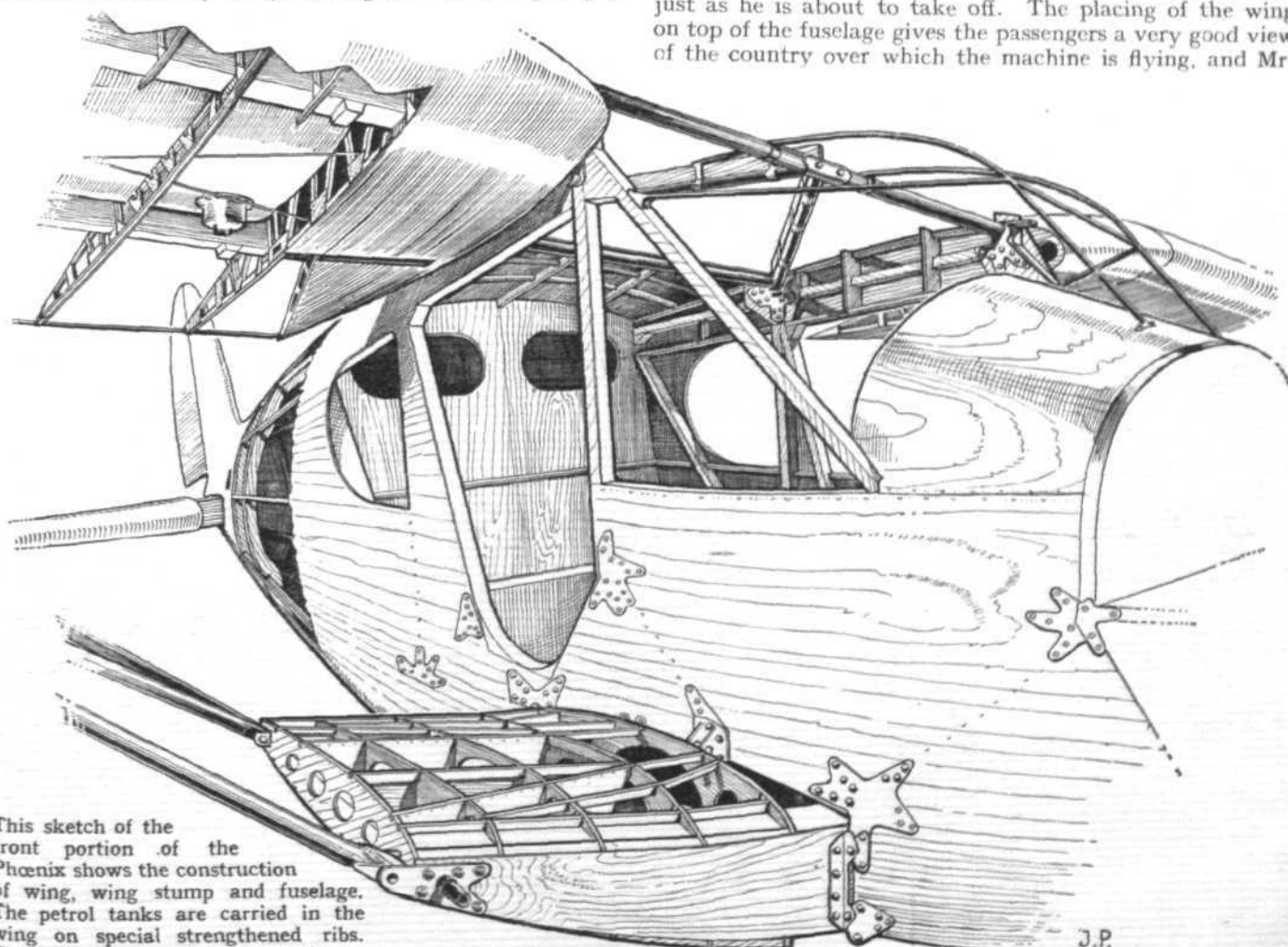
THERE are two distinct ways of setting about designing a civil aeroplane: One may evolve a very attractive-looking outline design, of good lines, high aerodynamic efficiency and generally pleasing appearance, afterwards trying how the desired accommodation may be worked into that outline; or one may start with a cabin of certain dimensions and accommodation, and steadfastly refuse to depart from that cabin ideal for any reason whatever, structural, aerodynamic or financial.

In producing the Phoenix, recently completed by the Heston Aircraft Co., Ltd., the latter method was followed by Messrs. Cornwall and Evans, and it is to their very great credit that without sacrificing one cubic inch, so to speak, of the cabin ideal which they had set themselves, they have succeeded in producing an aeroplane which is remarkably pleasing to the eye (as the illustrations show) and which is at the same time easy to fly, having no vices and giving a

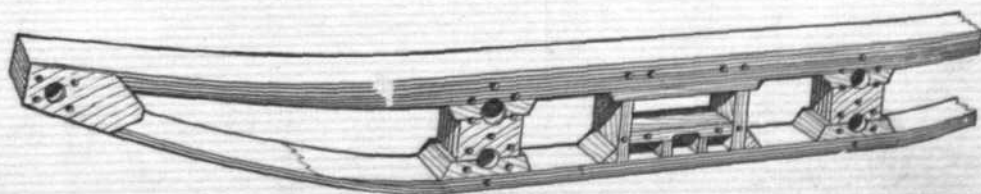
performance which must be considered quite satisfactory in view of the relatively low power expenditure of rather less than 40 h.p. per occupant.

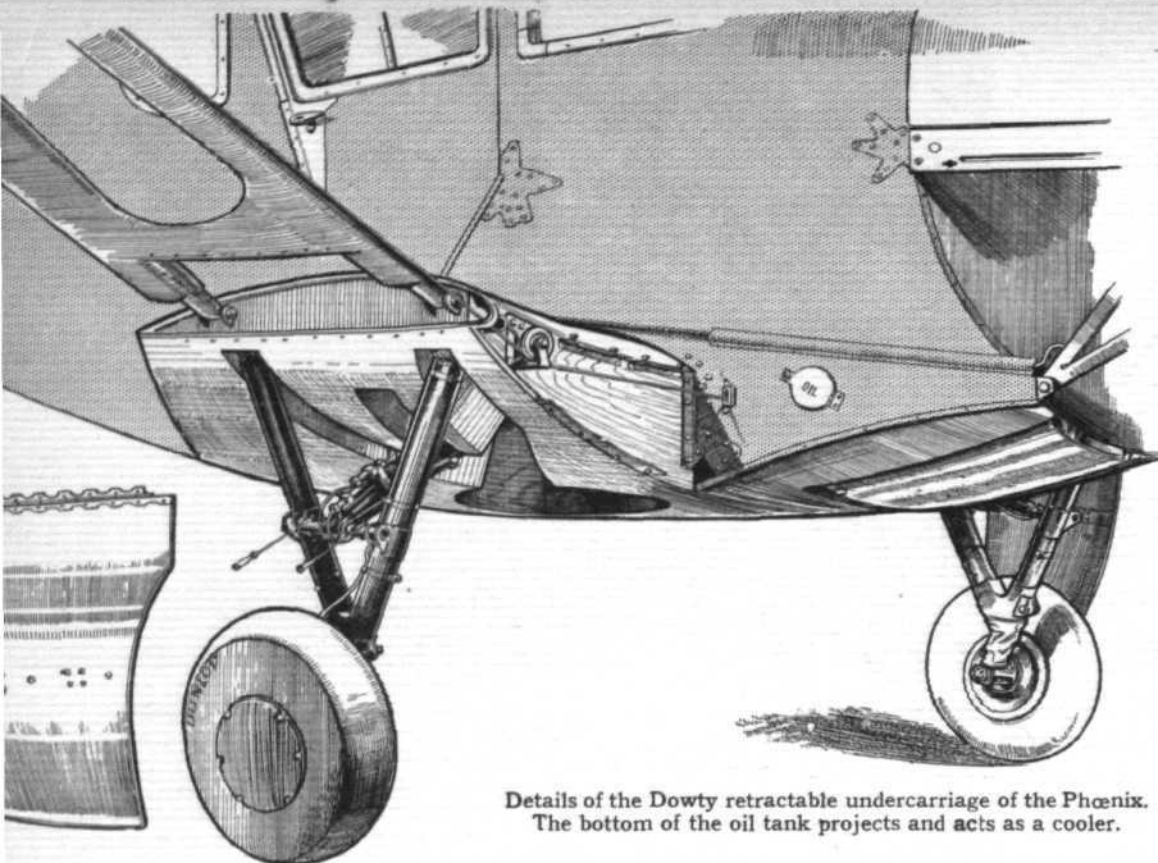
Comfort having been the chief consideration in the design, we were naturally inclined to be critical during a trip in the new Phoenix, but in truth there is almost nothing on which to pin any criticism. The five seats, at present arranged two abreast in front, two more abreast behind them, and a single seat at the back, were very comfortable indeed, the only one not having quite as much leg room as one would like being the single seat at the back. But as there is the whole cabin width available, the position of this seat can easily be altered as to provide all the comfort any one could ask for. In any case, seating accommodation is likely to be subject to the wishes of individual purchasers and to corresponding changes.

The view from the two front-seats is remarkably good, and the roof windows make it possible for the pilot to look back and ensure that no other machine is coming in to land just as he is about to take off. The placing of the wing on top of the fuselage gives the passengers a very good view of the country over which the machine is flying, and Mr.

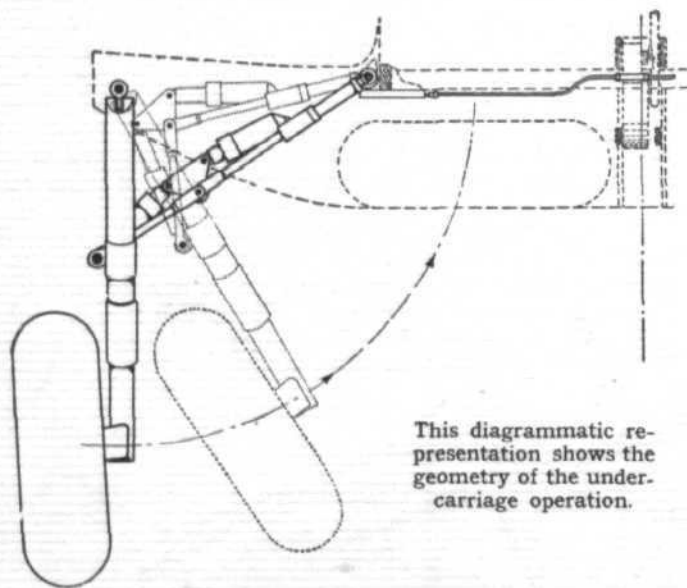


This sketch of the front portion of the Phoenix shows the construction of wing, wing stump and fuselage. The petrol tanks are carried in the wing on special strengthened ribs. The front part of the fuselage has a girder structure while the rear is monocoque. Details of a wing-stub spar are shown in the smaller sketch.





Details of the Dowty retractable undercarriage of the Phoenix. The bottom of the oil tank projects and acts as a cooler.



This diagrammatic representation shows the geometry of the undercarriage operation.

b



has managed to get the average noise level in the cabin down to just over 70 decibels, a figure which one associates with the type of aircraft which the lay Press is fond of calling a "giant airliner." Conversation can be carried on without difficulty, and the size and placing of the windows are such that one has none of that "cooped-up" feeling which is likely to assert itself in a less well-lighted cabin.

Dual controls are provided, the wheel being mounted on a "swing-over" type of arm. The instruments are placed in front of the port front seat and include the usual Smith equipment, plus a Smith turn indicator, a "Husun" compass and a very neat undercarriage indicator in which a small image of a wheel and strut swings across an illuminated screen, a red light showing until the undercarriage is in the "fully down" position. The hydraulically operated undercarriage, incidentally, can be retracted in about twenty seconds and lowered in about sixteen seconds. The pump handle is placed between the two front seats, so that it can be operated from either.

Although the Phoenix is by no means a large machine, the cabin space is no less than 140 cu. ft., measuring 9ft. 6in. in length and having an average width of 45in. and a mean height of 52in. Behind the cabin and separated from it, with a door on the port side, is a luggage compartment of no less than 22 cu. ft. capacity, measuring 25in. in length, 30in. in mean width, and 39in. in average height. Should it be desired to use the machine as a mail carrier, leaving the two front seats in the cabin and a reasonable space around the doors, the total mail space available is 92 cu. ft., which is more than ample for the load the machine can carry.

In general design the Phoenix is a high-wing strut-braced monoplane, the most unusual feature of which is the use of short wing stubs at the bottom of the fuselage. These stubs serve as an anchorage for the wing struts and undercarriage struts, and they form the housings for the wheels

In spite of its wide fuselage, the Phoenix is very "clean." This photograph also gives a good idea of the pilot's view. (Flight photograph.)





when the undercarriage is retracted.

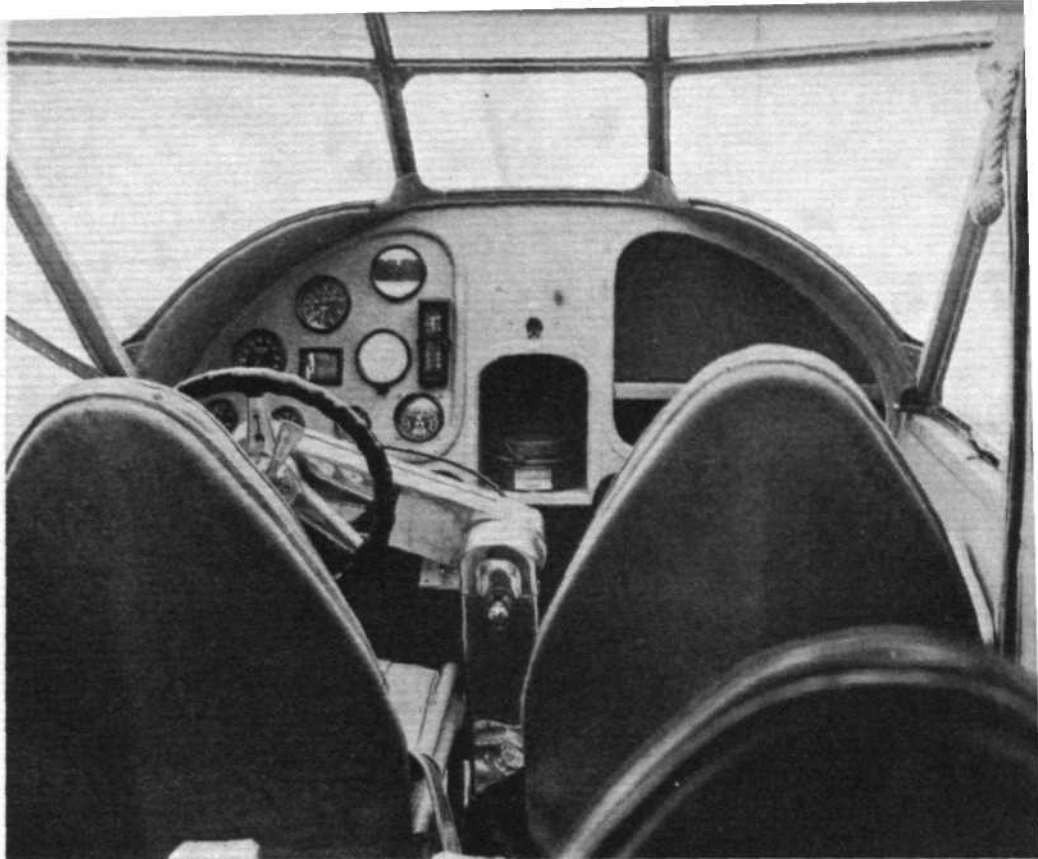
Structurally, the machine is almost entirely of wood, with an orthodox two-spar wing construction, fabric covered, while the fuselage is also entirely of wood, covered with plywood, over which is placed a doped fabric for weathering purposes only. An unusual feature of the fuselage construction is that the cross-section is rectangular over the cabin portion and gradually becomes elliptical as the stern is approached, the luggage compartment forming a transition bay between the front braced truss structure and the rear *monocoque* shell.

The tail is of the full cantilever type, and rudder and elevator have hinges of the inset type to provide aerodynamic balance. The tailplane is of the fixed type, trimming being done by a tab on the port elevator. A fully castoring tailwheel is fitted.

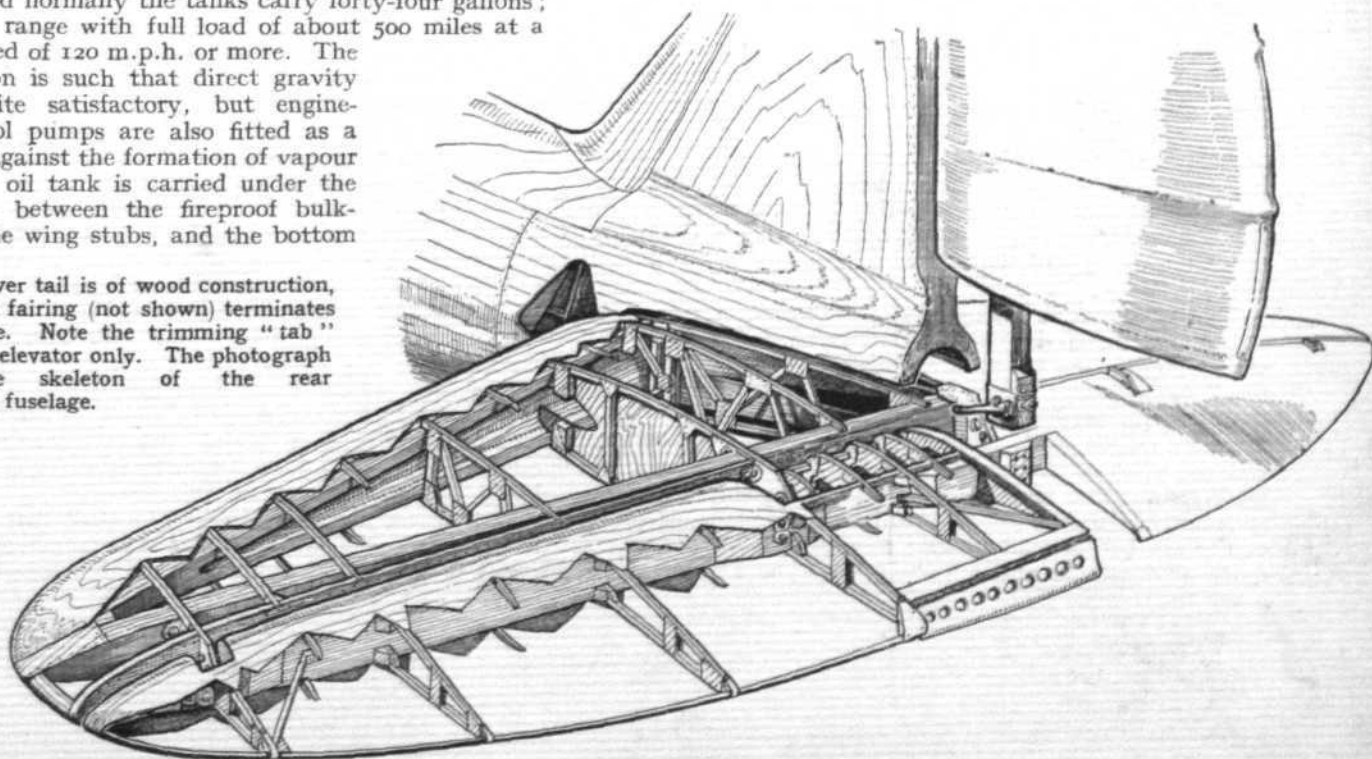
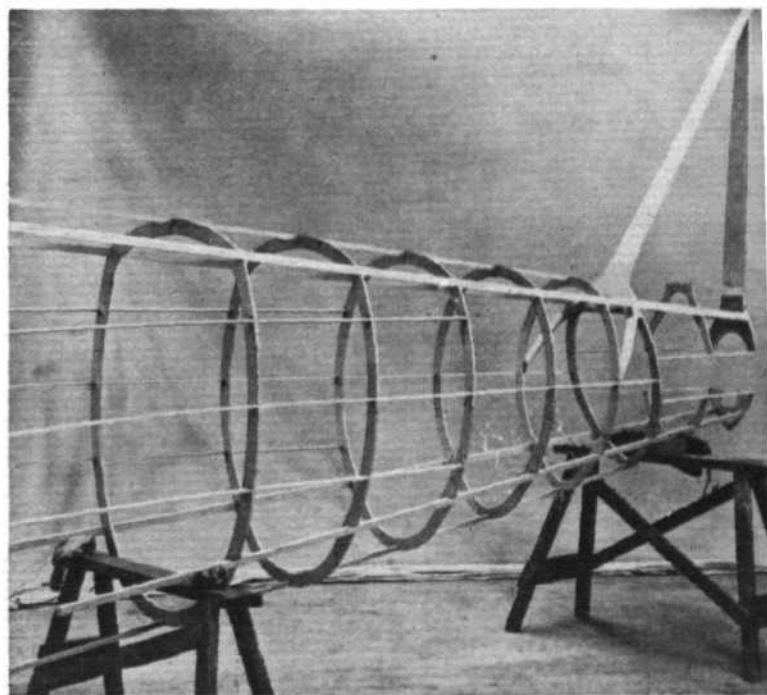
An interesting feature of the Phoenix is the retractable undercarriage, for which Mr. George Dowty has been responsible. The principle of the operation will be most easily understood from an examination of the sketches. When the wheels are raised they rest in recesses in the lower wing stubs, and the trenches in which the struts lie are covered by a shield so that the whole under-side is left smooth.

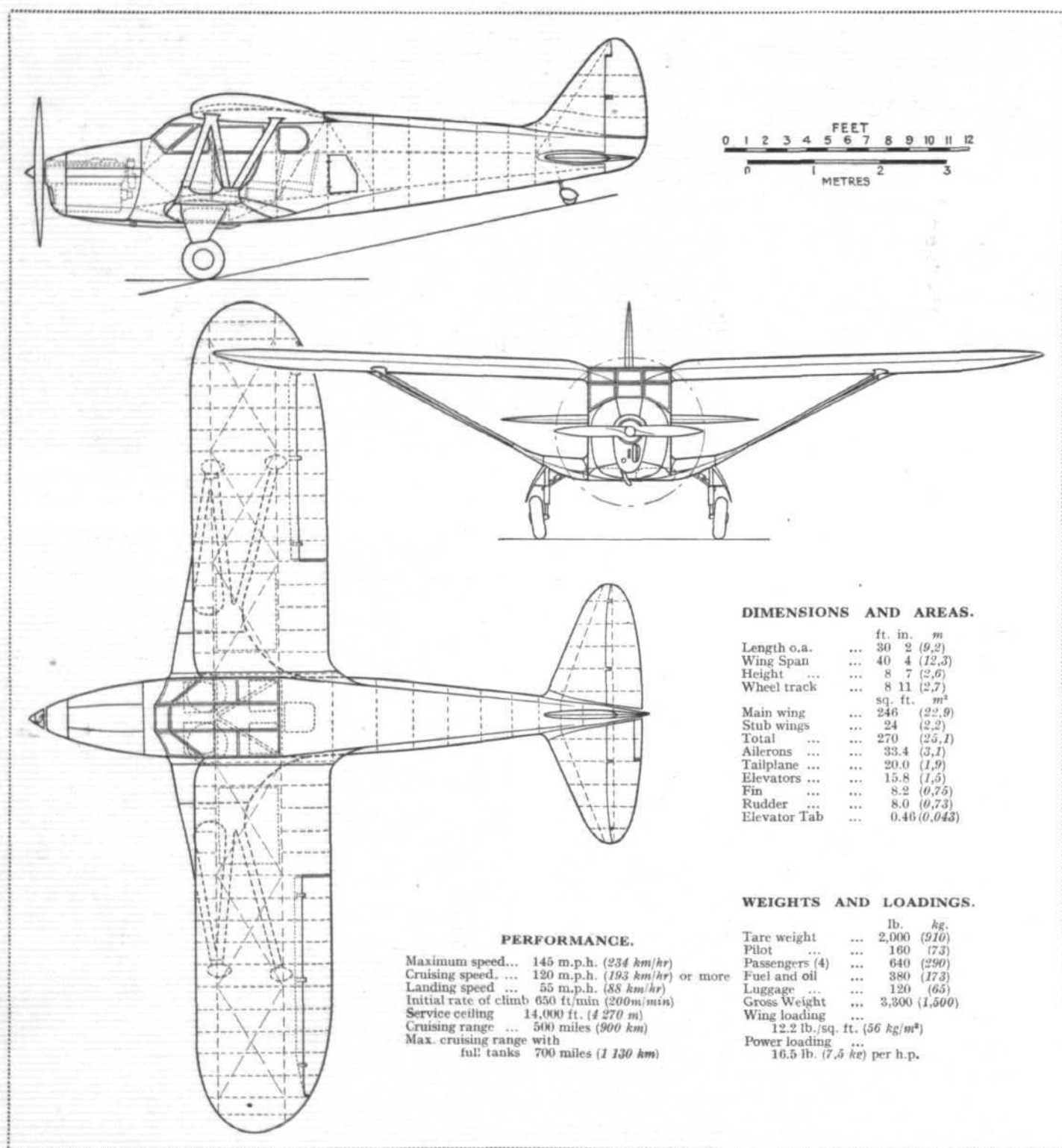
Power is supplied by a De Havilland Gipsy Six inverted six-cylinder engine of 200 h.p. The unit is carried on rubber vibration dampers in a welded steel tube frame. The fuel tanks are mounted on rubber trunnions in the wing, one on each side of the fuselage. The tanks have a total capacity of sixty gallons, but with a full complement of passengers this quantity of fuel would represent an overload, and normally the tanks carry forty-four gallons; this gives a range with full load of about 500 miles at a cruising speed of 120 m.p.h. or more. The tank position is such that direct gravity feed is quite satisfactory, but engine-driven petrol pumps are also fitted as a precaution against the formation of vapour locks. The oil tank is carried under the cabin floor, between the fireproof bulkhead and the wing stubs, and the bottom

The cantilever tail is of wood construction, and a metal fairing (not shown) terminates the fuselage. Note the trimming "tab" on the port elevator only. The photograph shows the skeleton of the rear *monocoque* fuselage.



In the cabin: The instruments are grouped in front of the port seat. On the right is a large locker for maps. Note the "swing-over" control. (*Flight* photograph.)





surface of the tank serves as an oil cooler. A long exhaust pipe runs under the fuselage, asbestos lining under the outer aluminium covering affording protection against fire risk. A wooden airscrew, made by the Airscrew Company, is fitted as standard, but metal airscrews can be fitted if desired.

The aerodynamic qualities of the Phoenix are good, as already mentioned the machine having no vices. The "N" strut wing-bracing affords great strength and rigidity, while the "washed-out" elliptical wing tips, in conjunction with the Frise-balanced ailerons, avoid any tendency to "drop a wing" at the stall. When stalled with the rudder central the machine shows no tendency to go into a spin, but merely sinks in a level attitude. By using the rudder the spin can, of course, be started as in any aeroplane. In spite of the absence of trailing edge flaps, the landing speed is quite moderate at about 55 m.p.h. The Dunlop wheel

brakes reduce the landing run to quite small proportions.

From the user's point of view the Phoenix should have much to recommend it. The modest power expenditure for the load carried should result in very economical operation. Ease of maintenance should be ensured by the number of inspection panels at vital points. The number of lubrication points has been reduced by the use of "Oilite" self-oiling bushes and ball bearings wherever possible.

The first machine has been finished in a light green, picked out with a darker green, and with wider silver lines. The wing has a silver finish. The Titanine doping scheme adopted has resulted in a very attractive finish, the fuselage being particularly good in this respect.

It is worth placing on record the fact that not a single modification of any importance was found necessary as a result of the official flying tests at Martlesham Heath. A



A side view of the Phoenix. The Titanine finish is pale green, picked out in darker green, and silver. (Flight photograph.)

small degree of experimentation is still to be made with such items as ventilators in order to get the best possible combination of ventilation without noise, but in all essentials the machine is ready for production, and a batch is

now being laid down. The price of the Phoenix has not been definitely fixed at the moment, but will be announced shortly. The machine should be an attractive proposition with a number of possible uses.

An Unusual Trophy

STUDENTS of Air Service Training, Ltd., annually compete for seven handsome trophies awarded for proficiency in various branches of the school's work. To these have now been added a new award, the Pantvaidya Ground Engineers' Trophy. Offered for annual competition among pupils taking the ground engineers' course, it is in the form of a silver reproduction of the actual licence for that branch of aircraft-manship. The trophy has been presented by Mr. B. G. Pantvaidya, of Indore, India, in memory of his son, a Hamble ground engineer student, who, on the eve of taking his final examination, crashed in his private aeroplane while on his way back to the school.

Motor Transport at Olympia

IN view of the mechanisation of transport, both in industry and in the Forces, more than usual interest is attached to the forthcoming biennial Motor Transport Exhibition at Olympia, November 7-16. In connection with this show our sister journal, *Motor Transport*, announces three Special Show Numbers: October 26, The Buyers' Guide; November 2, Show Forecast; and November 9, Full Show Report. These issues will be profusely illustrated.

The Lowe-Wylde Fund

BY last week-end the Lowe-Wylde Memorial Fund had reached the £600 mark. The latest list of donations is as follows:—

	£	s.	d.
Lieutenant H. Kidston	5	5	0
Scottish Flying Club, Ltd.	5	5	0
Miss Joanna E. Giles	5	0	0
Anonymous	5	0	0
Sir Charles A. Wrench	3	0	0
Norfolk and Norwich Aero Club	2	2	0
Lieutenant Colonel M. O'Gorman	1	1	0
J. Saycatch	1	1	0
J. S. Tritton	1	1	0
Captain Leslie A. Walters	1	1	0

Donations should be sent to Mr. E. C. Gordon England at the London Air Park, Feltham, Middlesex.

Testing Lubricant Film-Strength

IN the *Aircraft Engineer* of November 1, 1934, a description was given of a simple machine which provides accurate information on the load carrying capacity of lubricants, measures friction and calculates the wear resisting properties of materials.

This apparatus was developed and designed during research work in the laboratories of British Timken, Ltd., Birmingham, and was originally intended for the company's exclusive use in the manufacture and application of ball and tapered roller bearings.

Such, however, has been the appreciation of the machine's utility by engineering and other industrial concerns that many duplicates have been ordered and dispatched to various parts of the world. Among the list of prominent users may be mentioned Germ Lubricants, Ltd., Imperial Chemical Industries, D. Napier and Sons, Ltd., Director of Navy Contracts (Admiralty), and Shell-Mex, Ltd. (Amsterdam Laboratory).

Altimeter Charts

A NEW set of specially made charts for self-recording altimeters has been produced by M. W. Dunscombe, Ltd., 5 and 7, St. Augustine's Parade, Bristol, 1. They are of strong paper, obtainable in either thick or thin types, and are priced at 4s. 3d., post free, a set of fifty.

Mr. B. Stephan's New Post

HIS many friends all over Europe will be interested to learn that after very many years as manager of the Fokker works in Amsterdam Mr. B. Stephan is shortly severing his connection with the Fokker company and leaving to take up the post of aeronautical adviser to the Turkish Government. His long experience of aircraft manufacture and marketing should prove invaluable to them.

"Step," as his friends call him, is an accomplished linguist, and it will not be surprising if, in a few months' time, he is found to have added Turkish to the already long list of languages in which he is able to converse fluently. Mr. Stephan's headquarters will be at Ankara.

To Assist the Smaller Gliding Clubs

THE Federation of British Gliding Clubs has recently been formed with the object of assisting gliding clubs which cannot, under the 25-minimum-membership rule, qualify for affiliation to the British Gliding Association. The Federation intends to help such clubs to keep in touch with one another and to provide for them an authoritative means of voicing their interests.

It is stated that it is not the intention of the Federation to operate contrary to the interests of the British Gliding Association, but, by pursuing the same objects as those of the Association, to assist the smaller clubs towards increased activity and development, and, eventually, enable them to qualify for active affiliation to the B.G.A. Clubs which are already affiliated to the Association and which also become members of the Federation will, it is felt, be lending a very welcome helping hand to the weaker clubs. That this is possible is shown by the fact that the Federation is making arrangements for soaring sites to become available to its members.

Details are obtainable from the Hon. General Secretary, at Lady Place, Sutton Courtenay, Berkshire.

Correspondence

The Editor does not hold himself responsible for the opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for publication in these columns.

AERODROMES OUT OF THE PETROL TAX?

[3075] The November municipal elections are almost due, and it would be quite a good thing if aviation enthusiasts in every town could attend candidates' meetings and ask (a) for the provision of a local aerodrome, and (b) that a request be made to the Exchequer for a grant towards the cost of the aerodrome from the 8d. per gallon petrol tax which aeroplane owners have to pay. The average town council is more or less used to obtaining grants out of the Road Fund, so the minds of its members should be quite ready to grasp the fairness of the demand for aerodromes out of the petrol tax.

I don't know whether or not it applies to the country as a whole, but in this district they have, speaking generally, done rather more road improving than is really necessary and are beginning to mess about with balls on sticks and roundabouts. In the country lanes things have been altogether overdone. During a walk of four miles down a former country lane I found that it had been widened to about eighteen feet, tarmacadamised, and the grass verges removed, leaving no room for horse riders; during the whole walk only one old Morris car passed me.

ERIK T. W. ADDYMAN.

Harrogate.
Some comments on this subject, by "Indicator," will be found on p. 439.—Ed.]

IN DEFENCE OF THE "POU"

[3076] I hope you will allow me space to congratulate you on exhibiting a much more broad-minded attitude towards the much-maligned Sky Louse than do some of your contemporary periodicals. But why publish articles such as that of your contributor, Mr. W. Boddy, in your issue of October 17, which not only consists in the main of misinformed surmise, but is calculated to confuse the issue for a great many people to whom the *Pou* has meant a means of getting into the air hitherto unavailable?

First as to the facts. The *Pou* does not cost £150—it costs the home builder £75 from parts readily obtainable. Restrictions on radius of flight, as you rightly point out, exist only until the easily obtained Limited "A" Licence is granted, when the *Pou* can be flown anywhere in the United Kingdom. Until the pilot qualifies for this licence he will probably operate from a recognised aerodrome, where he will have plenty of room to learn the feel of his machine on straight flights before he attempts to turn. Mr. Boddy quotes a figure of 8 h.p. to 10 h.p., behind which no *Pou* could leave the ground, and actually, with standard types of engine giving cruising powers of 28 h.p. or so, a cruising speed of 70 m.p.h. is usual. Reliability is on an exactly similar footing to that of any single-engined aircraft, and dual ignition is by no means barred.

But compare the *Pou* with the suggested substitute. Most people who will build *Poux* for £75 cannot possibly afford to pay £400 for the sole advantage of one extra seat in a 40 h.p. two-seater. And this is the only real gain, for the *Pou* at 70 m.p.h. cruises at only 10 m.p.h. less than Mr. Boddy's ideal, while his running costs with a 40 h.p. engine will be considerably greater, and maintenance under full C. of A. regulations will be an expensive and hampering nuisance.

I am entirely with him in his cry for smaller and cheaper

aeroplanes, but let us have our air motor cycles, in order that, just as the motor cyclist aims to and eventually does purchase his small four-seater car, so an increasing market may be built up from the motor cyclists of the air.

The surprising thing to me is that the *Pou* is not yet generally regarded as the business man regards his car—as an uncommonly swift and convenient way of getting about. Nowadays the roads of this country are not only extremely dangerous physically, but justice to their users is being meted out in a way which the motoring community itself realises is utterly unjust. It is an appalling thought that law-abiding citizens are every day being clapped into gaol, with all its possible consequences, for offences which in any other walk of life would rightly be regarded as pure accidents. Until this panic legislation is replaced by the only possible remedy—a proper road system—I for one do not propose to risk becoming a maimed gaolbird when ways of increasing one's speed above the chaos are available.

Aerodromes exist on the boundaries of all our large cities, and if one wishes to visit smaller places it is simply a matter of finding a suitable field and descending. The farmer is usually only too pleased to receive an unexpected tip, and once the "local aerodrome" is decided upon the local bus service will do the rest. Conditions of fog or excessive wind which make it impossible to fly, usually mean delay to all other forms of transport, and one can always take the train. So that the one remaining comparison—speed shows a credit balance for the *Pou* as against the ordinary car of about 30-35 m.p.h.

By all means let us have our two-seaters, but let us admit that for a great many people the *Pou* does solve a problem which hitherto has not been tackled in this country.

London, S.E.3.

H. MAYNARD THOMPSON.

WOMEN PILOTS FORWARD, PLEASE

[3077] When the Reading Aero Club was officially opened in 1931—actually it came into being in 1929—Lord Northesk, who was then our president, presented the Club with a valuable challenge cup to be competed for annually by means of a race for women pilots.

However, it soon became evident that the possible honour and glory of holding the cup for twelve months did not make up for the wear and tear of competitors' machines, and entries were very few.

Perhaps the ladies themselves have views as to the most useful purpose to which the cup could be put? If our sporting aviatrixes would be kind enough to express their thoughts on the subject I should be very grateful.

London, W.C.1.

C. A. NEPEAN BISHOP,

Hon. Secretary, Reading Aero Club.

IN BRIEF

Mr. Geoffrey Dorman, of the British Union of Fascists, states that someone has been getting into touch with firms in the aircraft industry and ordering material in his name on behalf of the B.U.F. He adds that all but the most urgent official orders will be given in writing and signed by two officials.

Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in the list.

- Oct. 12-28. International Aircraft Exhibition, Milan.
- Oct. 30. Brancker Memorial Lecture: "Air Transport in Great Britain," by Lt.-Col. Sheldermine, 6 p.m., Institution of Electrical Engineers.
- Nov. 1. Royal Air Force Flying Club. Jubilee Ball, Grosvenor House, London.
- Nov. 4. R.Ae.S. Lecture: "The Prevention of Ice Accretion," by B. Lockspeiser, 6 p.m., Institution of Electrical Engineers.
- Nov. 13. Royal United Service Institution Lecture: "Oil from Coal in War Time," by Col. W. A. Bristow, at 3 p.m.
- Nov. 18. R.Ae.S. Lecture: "Cooling Problems, with Particular Reference to the Work of the 24-ft. R.A.E. Tunnel," by Dr. G. P. Douglas, 6 p.m., Institution of Electrical Engineers.
- Nov. 29. Yorkshire Aeroplane Club. Annual Ball, Hotel Majestic, Harrogate.

- Dec. 2. R.Ae.S. Lecture: "Undercarriage Design," by G. H. Dowty, 6 p.m., Institution of Electrical Engineers.
- Dec. 6. Hampshire Aeroplane Club: Tenth Annual Dinner and Dance, South Western Hotel, Southampton.
- Dec. 16. R.Ae.S. Lecture: "Wireless and its Application to Commercial Aviation," by Capt. J. M. Furnival, 6 p.m., Institution of Electrical Engineers.
- Dec. 20. London Aeroplane Club. Annual Ball, Park Lane Hotel, London.
- 1936.
- Jan. 22. Royal United Service Institution Lecture: "The Expansion of the Royal Air Force," by Air Marshal Sir C. L. N. Newall, at 3 p.m.
- Mar. 10. Royal United Service Institution Lecture: "The Development of Civil Aviation," by Lt.-Col. F. C. Sheldermine, at 3 p.m.

Private Flying



Topics of the Day

Relative Skill

ONE of the most interesting, not to say disturbing, facts about this flying business concerns the enormous differences in aptitude and judgment displayed by different people.

During the *ab initio* stages the differences are not so noticeable, because everything is being carried out according to plan and under the very eye of an instructor. Some pilots may be safely allowed to go solo in five hours, while others may need as much as twelve or fifteen hours of dual instruction. This variation usually means very little because the smallest difficulty may prevent an otherwise perfectly safe novice from being sent off. In fact, the pilot who is fairly slow in picking things up is often safer in the long run because he has been under very close observation for a much longer period.

Usually it is after about fifty hours of solo and instructional flying that the real differences are most obvious, though I was once told of a 5,000-hour pilot who was turned down by a young instructor as being quite unsafe with a particular light aeroplane—much to his annoyance.

At the end of fifty or a hundred hours a pilot is either sure of himself, much too sure of himself, or not at all sure of himself. The first and last are usually quite safe, while the second is often as unsafe as he could possibly be.

A Question of Temperament

RELATIVE flying skill has always appeared to me to be almost entirely a matter of psychology—hence the fact that good pilots are born, and not made. The man who has a little sane doubt of his own judgment may never be a brilliant pilot, but he will go on living. He is temperamentally cautious, but not over-cautious, and must always learn to walk before he can feel certain that he can run unaided.

It is an unfortunate fact that an unimaginative semi-moron may drive a car for years without coming to any great harm, while the same man will make the safest aeroplane into a sort of flying coffin, for the simple reason that the most docile machine rarely forgives any outrageous error of judgment or savagery with the controls.

Because the safe pilot is an almost unpredictable phenomenon insurance rates must still remain unpleasantly high for all of us. These rates can only be based on average risk, though, above a certain minimum, various pilots may obtain very favourable terms. One has only to talk to people connected with the fly-yourself hire business to realise the inadequacy of a scale based on mere hourage, and, at the same time, the impossibility of basing insurance rates on any other factor. The most reckless of pilots will be on his best behaviour during a try-out with an instructor.

A Rhythm Break

IT appears rather that private owners and air-line operators may have a comparatively thin time while this vast expansion programme is being carried out.

Nobody in this world of regrettably false values can be expected to spend time and money in the development of safer, faster, or what-you-will private and commercial types for a comparatively tiny market when infinitely larger orders are obtainable for other things. Designers may have the prettiest of ideas which simply ask to be put on a drawing-board, but the shareholders have always, since the species came into being, demanded cash returns rather than æsthetic satisfactions.

Necessity is the only true mother of invention, and the private owner may have to wait for the millennium before he obtains the perfect aeroplane. He will possibly have wings of his very own before then.

Meanwhile, we have a very nice range of aeroplanes from which to choose, and I suppose that we must count ourselves lucky that the various manufacturers have been sufficiently energetic to have considered the private owner at all.

Only two years ago the publicity man of a certain big firm volunteered the statement that "there is nothing in this private-owner market." I neglected to remind him of one firm which had obtained something of a corner for itself in this very useful market at the beginning of the movement.

Payment for Nothing

IT has always appeared to be a little odd that air line operators, private owners and clubs should be expected to pay a tax of 8d. a gallon on the fuel used when this tax is ostensibly, though not, perhaps, actually, intended for the Road Fund. During a recent year the tax obtained from the fuel used by the flying clubs in this country was just £2,000 higher than the subsidy paid to them—an amusing effect of watertight financial departments.

Theoretically, of course, the petrol tax obtained from aeroplane operators should go towards the development of the necessary ground facilities and the various local authorities might automatically receive a proportionate subsidy from the Road Fund. Such an arrangement would not lay itself open to the usual criticism—that the additional staff work necessary to separate the taxes on the fuel used for aviation and motoring would be extremely expensive. In the meantime the situation is ridiculous, both from the operator's and the club's point of view, but in the midst of more important problems nobody is likely to do anything about it just now. One can only hope that when everyone stops killing, or thinking about killing, everyone else the matter may be examined. INDICATOR.

Private Flying**FROM the CLUBS***Events and Activity at the Clubs and Schools***LIVERPOOL**

During the week ended October 17, 61 hr. 5 min. were flown by the Liverpool and District Aero Club in fair flying conditions.

C.A.S.C.

On Monday of last week three members of the Corps flew for 45 minutes and on last Sunday, in spite of a very high wind, 2 hr. 30 min. was logged. Members were pleased to meet Col. P. May again, who is back from China and instructing at Cambridge.

LONDON

The London Aeroplane Club's Dance has been arranged for Friday, December 20, at the Park Lane Hotel and the Turkey Lunch will be held on Sunday, December 15, at the club.

Mr. R. D. Morrison has obtained his "B" licence and the flying time for last week was 91 hr. 55 min.

READING

Flt. Lt. and Mrs. Tom Rose gave a house-warming last Saturday at their new residence, "Falcon House," Sonning-on-Thames. This took the shape of a cocktail party. Amongst the guests were Mr. and Mrs. Charles Powis, Mr. Luis Fontes, Miss Ruth Fontes, Mr. Peter Godfrey, Miss Jean Forbes-Robertson, Mr. and Mrs. F. G. Miles, Mr. C. A. Nepean Bishop, Mr. J. J. Scholes, Lady Payne Gallwey, Flt. Lt. and Mrs. R. Milne, Mrs. Pleydel-Bouverie, Mrs. Elise Battye and Mrs. Wykeham-Barnes.

Mr. Peter King and Mr. P. G. James officiated behind the "bar" and Fred Miles excelled himself as a cocktail maker and shaker.

High winds have interfered somewhat with flying during the week, but whenever conditions have permitted the club and school machines have been busy. The new school Hawk Major is now being flown and four new pupils have arrived.

DUBLIN

A meeting of the newly formed Dublin Aero Club's Special Committee was held on October 7, and a set of rules which were adopted will be submitted to the Club in the near future.

Three days later a competition was held for the Irish Cup, presented by Lady Nelson, and the first four machines were flown by Mr. C. F. French, the chief instructor, Capt. Hamilton, Mr. Williams, the flying manager, and Mr. J. Bell, the chief ground engineer. Mr. Bell also took first place in the landing competition.

On October 16 the American Minister visited Kildonan aerodrome, bringing with him an American pilot, Mr. Ball, who, with his brother, owns the Ball aerodrome between Chicago and Indianapolis. Mr. Ball is to have his licence validated for Ireland and has already done quite a lot of flying with the club.

HESTON

Three of the Heston School fledglings soloed on Sunday afternoon, October 13. All are doing well, and though comparisons are odious, it may be whispered that the three averaged out at 6 hr. 33 min. to solo on Avro Cadets—which is half an hour less than the published standard figure. The trio were Mr. P. S. Q. Anderson, a Heston workshop apprentice; Mr. F. J. Delves, of the Sperry Gyroscope Company; and Miss D. S. Stanhope, Assistant General Manager of *Time and Tide*. All of which disproves the view that flying is just another pastime for the idle rich.

Their three businesslike signatures have fitly inaugurated a new extension to the Heston First Solo Cup. Readers will remember that this confection of old dope-cans has been having bits stuck on to it at intervals ever since its original area got completely over-pasted with autographs. It now looks like something between the Albert Memorial and the Hanging Gardens of Babylon. Architects are being consulted on the next extension.

The Duchess of Bedford has taken delivery of her new Gipsy Six Gull, purchased from Airwork, and has "traded in" her Puss Moth. The Duchess owns two Moths, a standard Gipsy I and a special racing model. The new Gull is finished and upholstered in an attractive light green.

SOUTH COAST

Bad weather at the beginning of the week restricted flying at Shoreham but an improvement at the week-end enabled the club to do nearly 20 hours' flying.

One "A" licence was obtained during the week, Sir George Lewis passing his tests on Saturday. Miss Morewood and Messrs. Gazzard, Wingrave and Tuffil have joined the club.

REDHILL

At the Redhill Flying Club the flying time during the week ended October 18 totalled 60 hr. 25 min. Mr. J. K. Maxwell made a first solo and Mrs. Kronfeld passed her "A" licence tests on a B.A.C. Super Drone.

Mr. R. Bennett made a "B" licence night flight and two blind flying certificates were obtained. Three new members have joined the club.

HARROGATE

The position of the Aircraft Club is being steadily improved with an increase in the reserve of training gliders, and the club hopes, as last year, to fly regularly every week-end throughout the winter. Two *Poux* are being built by members and the construction of a low-powered aeroplane is shortly to be started.

There is talk, incidentally, of a Harrogate aerodrome and of the possibility that the York County Club may then move there, but whether the Aircraft Club will join them or not is still a matter of conjecture.

YORKSHIRE

Flying on Yorkshire Aeroplane Club machines totalled 43 hr. during the fortnight ended on October 19 and Mr. Hull made his first solo. Mr. P. M. G. Thorpe, of Leeds, has started flying training under the auspices of the Air League Young Pilots' Fund and Miss E. M. Hailwood has done likewise as winner of the club's recently awarded Flying Scholarship, which carries free flying training to the value of £30. The club will again celebrate November 5 in traditional manner with a bonfire and fireworks display.

The annual ball will be held at the Hotel Majestic, Harrogate, on Friday, November 29. Tickets, which will include dinner, dance and cabaret, will be 21s. each.

BROOKLANDS

Two new members joined the Brooklands Flying Club last week—Mr. Barlow and Mr. Brochie, who is home from Singapore. Miss M. Duncan and Miss Wardell have each accomplished their first solos and Mr. Dudley Froy has obtained his "A" licence. Mr. Brookes has returned to do a Blind Flying Course, and Flt. Lt. Comerford is taking both an Instructor's and a Blind Flying Course.

Last Sunday a most successful tea dance was held in the club, a large number of people attending. The club had the pleasure last week of welcoming home Miss Betty Malcolm, who has returned from an aerial tour of Europe, including visits to Paris, Vienna, Budapest, Belgrade, Bucharest and Munich.

CINQUE PORTS

The first aviation dance of the Cinque Ports winter season was held on the 18th at the Leas Cliff Hall and was attended by many hundreds. Free joyrides and trial lessons were given away as prizes for "spot" dances and Mr. Robert Doig's *Pou* was on view. On the next day it was exhibited by the club at the "Happy Homes" Exhibition, Folkestone. Sir Philip Sassoon, who opened the Exhibition, showed keen interest in the little machine. Mr. Doig will test fly it during the week prior to his attempt to cross the Channel. On this flight he will be accompanied by machines of the Cinque Ports Flying Club. The Aeronca-Jap was demonstrated, in spite of bad weather, to many interested members during the week-end.

Flying time for the week ended on Thursday reached a total of 41 hr. Miss Thrupp, of Hastings, has passed her "A" licence tests. New flying members are Miss E. M. Andrews, and Messrs. Ian Galloway (Seaforths), David Cox and G. F. Dean.

IT IS AN AERONCA:

In this particular photograph the new Aeronca low wing monoplane, described on the following page, is shown fitted with the Le Blond "70" engine, but the 85 h.p. Le Blond, 90 h.p. Warner Scarab Junior, 125 h.p. Warner Scarab and 90 h.p. Lambert radials are alternative engines.



HANWORTH

The London Air Park Flying Club's time for last week totalled 36 hr. 25 min., including a first solo by Mr. Ewen. Mr. Hoppe has passed his "A" licence tests and Lady Joan Hcare has been taking blind flying instruction. Mr. Tweddle has been using his racing Avian for business trips between Manchester and Hanworth.

HULL

The Scholarship Scheme of the Hull Aero Club has been a great success, and three of the successful candidates have already secured their "A" licences.

Unfortunately, it has been found impossible to hold the annual ball this year, but, to take its place, a dance will be held in the clubhouse on New Year's eve. No tickets, which cost 5s., will be sold at the door.

CAMBRIDGE

The flying time at Marshall's Flying School and the Cambridge Aero Club totalled 56 hours for the week ended October 19. Two new members—Messrs. Barberet and Issarverdene—have joined, and first solos were carried out by Messrs. Colbourne and FitzGerald. The Duke of Grafton has purchased a second-hand Moth.

CARDIFF

Although the Cardiff Aeroplane Club has been somewhat handicapped owing to the fact that two of its machines have been undergoing their C. of A. overhaul and to the fact that the weather has been bad, the flying time for the week ended October 15 totalled 8 hr. 30 min.

The fifteen semi-finalists for the Western Mail Scholarship Scheme have now been chosen and it is hoped that by the end of this week further tests will make it possible to publish the names of the four lucky finalists. Mr. J. P. Capper has qualified for his "A" licence, and a large number of members have joined the club.

Cardiff Airport is at present the only landing ground in the West of England which is fully equipped for night flying. In addition to the floodlight, which was installed several months ago, eighteen electric boundary beacons have been supplied by the Cardiff Foundry, and these make it possible for a pilot to land quite safely without using the floodlight.

R.A.F.

With the regular inflow of new members, the Royal Air Force Flying Club is going steadily from strength to strength and now that the club has a fleet of three machines available, one of which is a cabin machine, considerably more interest is taken.

During the latter part of this summer the Puss Moth has been very popular, and on several occasions has been to Paris, Ostend, Amsterdam and other places on the Continent.

Recently it was decided to form a branch of the club out in Heliopolis, Egypt, and with his habitual magnanimity Lord Wakefield came forward and presented an aircraft for the purpose of the foundation of this branch. Widespread interest has immediately been evinced in this new section and in the additional facilities offered for those going abroad.

On Friday, November 1, the club is holding its first annual ball which will be known as the Royal Air Force Flying Club's Jubilee Ball, and which will be held at the Grosvenor House, Park Lane (tickets 25s. 6d. each). A large number of members and their friends are expected to be present. Enquiries and applications for tickets should reach the Secretary at Hatfield aerodrome as soon as possible.

An Eagle for Air Hire

It has always appeared to us to be rather remarkable that the B.A. Eagle has not found really wide popularity in this country. We would hesitate to suggest that the prospective private owner is so remorselessly conventional as to be afraid of something so relatively "old-fashioned" as a retractable undercarriage.

However, Air Hire, Ltd., took delivery of a standard Eagle last week-end and it will be interesting to see, in due course, how the widely differing pilots, who hire aeroplanes from this firm, take to it as a machine. The daily rate will be the same as that for the Falcon and the Leopard Moth—£5 5s., including full insurance. Incidentally, it is not generally realised that Air Hire, Ltd., are prepared, during the comparatively slack winter season, to hire out their various machines by the hour when available from more serious duties.

AN ARISTOCRATIC AERONCA

Cantilever Wing : Two-seater Side-by-side Cabin : 115 m.p.h. with 70 h.p.

WITHIN the last few weeks the little Aeronca high-wing wire-braced monoplane has been a familiar sight at several of our aerodromes, the licence for the machine having been taken out in this country by Light Aircraft, Limited.

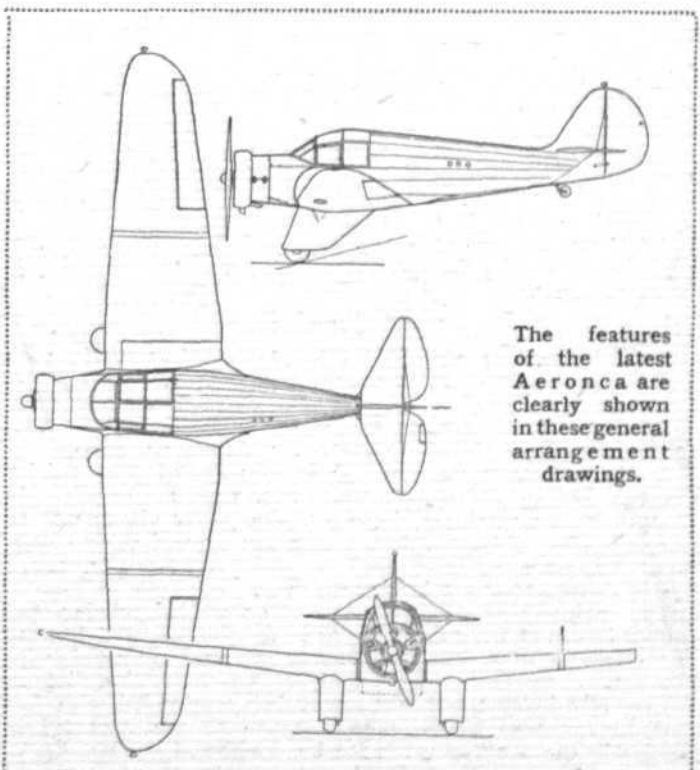
The latest machine to be produced by the Aeronautical Corporation of America (hence "Aeronca") is distinctly modern in appearance and is a two-seater low-wing cantilever monoplane. The wing is built up in three sections—the centre section extends straight through the fuselage out to the ailerons—and has box spars and built-up spruce ribs with a double-drag trussing. The tip sections have solid spruce spars with ribs and bracing similar to those in other portions. Fabric covers the entire wing.

The fuselage, which, likewise, is fabric covered, has a framework of welded chrome molybdenum steel tubing. A cabin, seating two, is built into the fuselage and permits fair visibility, due to the fact that the pilot sits on the front spar of the wing. Normally, the machine is fitted with dual controls, one set being removable.

A Le Blond "70" engine (70 h.p.) is fitted as standard, but any of the radial engines in the 70 to 90 h.p. class may be specified. The engine mounting is of welded steel tubing.

Within the wing is the main fuel tank, holding about 10 gallons. An engine-driven pump supplies the auxiliary six-gallon tank in the front end of the fuselage, which feeds the carburettor by gravity. A hand-operated fuel pump is also installed.

Welded steel construction with fabric covering is used for



The features of the latest Aeronca are clearly shown in these general arrangement drawings.

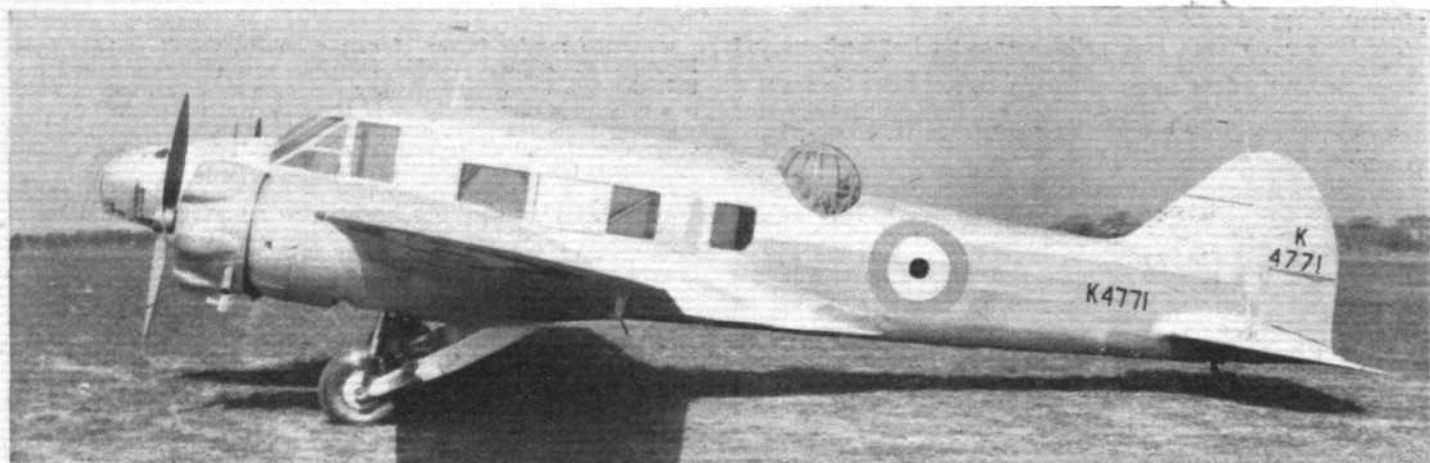
AERONCA LOW WING MONOPLANE.
Le Blond "70" Engine (70 h.p.)

Span	36 ft.
Length	22 ft. 6 in.
Height	7 ft.
Wing area	150 sq. ft.
Weight empty	875 lb.
Gross weight	1,500 lb.
Wing loading	10 lb./sq. ft.
Power loading	21.4 lb./h.p.
Maximum speed	115 h.p.
Cruising speed	100 h.p.
Stalling speed (full load)	48 m.p.h.
Service ceiling	13,000 ft.

the empennage. The tail plane is fixed, a small trimming tab being embodied on one side of the elevator.

An oleo-type undercarriage with "semi" or "full" airwheels is attached to the wing stubs. Brakes are fitted as standard, and the entire gear is streamlined with metal fairings.

Included in the standard equipment is wiring for navigation lights, an air-speed indicator and a compass. Powered with the Le Blond "70" engine the price is about 2,500 dollars.



FOR COASTAL RECONNAISSANCE

Some Constructional Details of the Avro Anson Monoplane, which is to Equip the General Reconnaissance Squadrons of the Royal Air Force

ONE hundred and seventy-four Avro Anson high speed twin-engined monoplanes have been ordered by the Air Ministry for the equipment of several general reconnaissance squadrons. The first unit to receive the machine will be No. 48. It is intended that the Ansons should be used on medium-range reconnaissance missions, for patrol and probably for anti-submarine work.

The Anson, or 652A, is a direct development of the Avro 652 commercial monoplane originally designed and constructed to the order of Imperial Airways as a feeder line and charter type (this machine was fully described, from the passenger-carrying point of view, in *Flight* of March 7, 1935). It is the first development of a commercial design to go into service with the R.A.F. and, structurally, resembles its civil counterpart.

Of cantilever type, the wing is built in one piece, and consists of two main spars of box section with laminated spruce flanges and plywood webs, joined by closely spaced ribs of plywood and spruce, the whole framework being covered with plywood. This form of construction, besides being easy to maintain, provides ample buoyancy should the machine be forced to descend into the sea.

The construction of the *empennage* follows the same lines as that of the wing, being built up of spruce frames with plywood covering.

Steel Fuselage

For the fuselage a welded tubular steel framework, with wood fairings and doped linen covering, is used. The fuselage frame is braced by rigid struts and stout flooring is fitted throughout the length of the pilot's cockpit and the rear cabin. Panels of electron sheet cover the nose portion.

In the prototype machine the engines are of the Siddeley Cheetah VI type, developing 290 h.p. each at 6,000 ft. In the production machines, however, the power plants will be Cheetah IX's, which are designed to run on fuel of 87 octane number and are normally rated at 310 h.p. at 6,000 ft. Their maximum power is 339 h.p. at 6,800 ft.

The engines themselves are carried on welded tubular steel frames built out from the wing and are mounted well forward of the leading edge. Long-chord ring cowlings are fitted, with "helmets" for each cylinder. The two engine installations are entirely independent, each unit being provided with fuel and oil tanks of welded aluminium which are mounted in cradles in the wing. Fuel is fed by duplicated pumps.

It seems likely that the Anson will be the first armed military type with a retractable undercarriage to go into service with the R.A.F. This undercarriage consists of two separate units each mounted beneath an engine nacelle. Each wheel has pneumatic shock absorbers, medium-pressure tyres and pneumatic brakes. Retraction is mechanical and there is a crank handle for alternative operation. When the wheels are in the "up" position a small section of the tyre projects, and at all times the undercarriage is visible to the pilot.

Parallel-motion rudder pedals and stick and wheel for elevators and ailerons form the flying controls. Both rudder

and elevator are mass balanced, and the ailerons are of the Frise type. The tailplane is, of necessity, fixed, but the elevator, like the rudder, is trimmed by small hinged flaps in the trailing edge, actuated by hand wheels from the cockpit. The instruments are arranged on a large panel, those for blind flying being provided with a shock-proof mounting.

On the port side, in the extreme nose of the fuselage, is the pilot's seat. The corresponding place on the starboard sides provides a prone bombing position. Dual controls can be fitted for training purposes, but when these are fitted the prone bombing position cannot be used. Either one or two fixed machine guns can be provided for the pilot (the R.A.F. type will have one). There is, of course, no interrupter gear.

Immediately behind the pilot's cockpit is the main cabin, which has ample windows on each side and in which provision is made for wireless telegraphy, navigation and photography.

At the extreme rear of this cabin is the rear gunner's station. On account of the high speeds attained by the Anson it is impossible to use an ordinary wind-balanced gun ring and an open cockpit. Guns can, however, be mounted to fire on each side of the rudder with movement through a few degrees (the gunner being protected by an adequate windscreen) or an enclosed revolving turret can be provided. In the R.A.F. Ansons an Armstrong Whitworth turret will be used.

Racks for a maximum of eight 20lb. bombs and two 100lb. bombs are provided inside the wing; any variation or increase in this bomb load necessitates external stowage.

Recently a member of the staff of *Flight* was privileged to fly in the prototype Anson and to occupy the rear gun turret during a mock combat with a fast two-seater biplane. He found the Anson to be extremely manoeuvrable for a machine of its type, and that the rear gunner, from his comfortable turret, has an excellent field of fire.

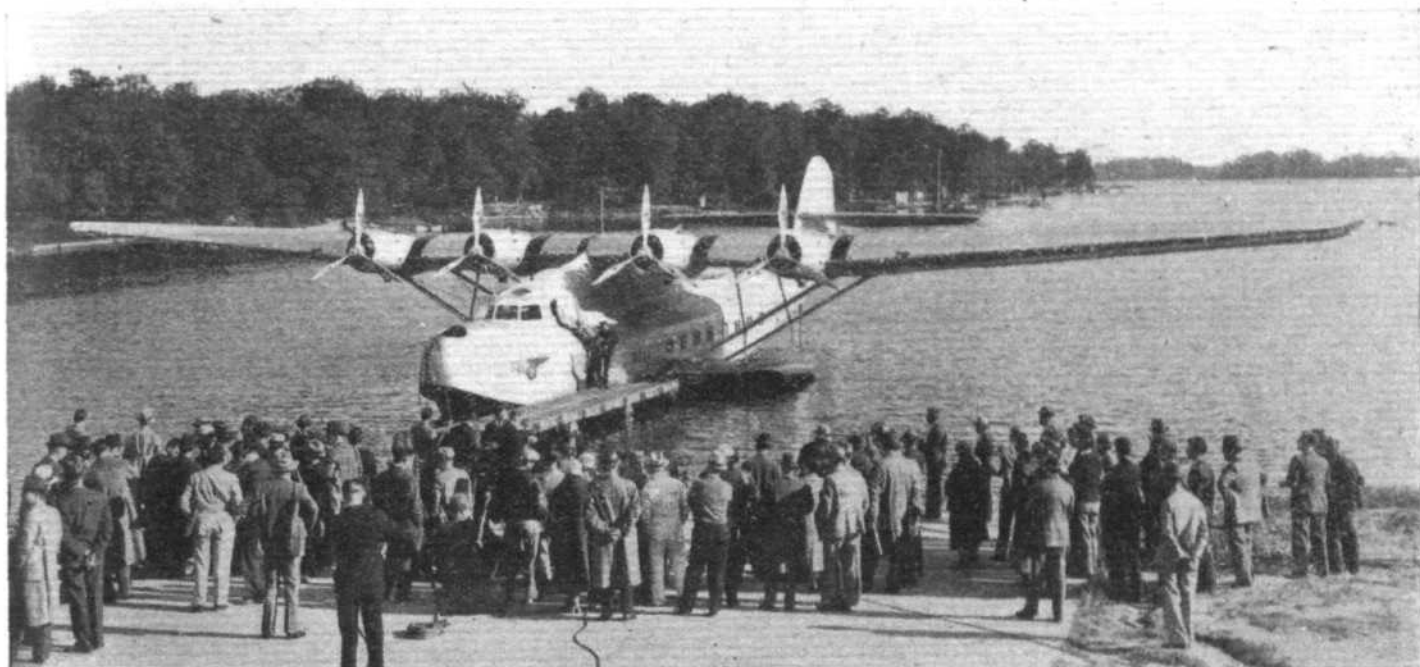
It is claimed that with one engine stopped and when fully loaded, the Anson can maintain level flight at 6,000 ft.

AVRO 652A (ANSON)
Coastal Reconnaissance Monoplane
Two Siddeley Cheetah VI. 290 h.p. at 6,000 ft.
(to be replaced by Cheetah IX's)

DIMENSIONS	
Span ...	56 ft. 6 in. (17.2 m.)
Height ...	9 ft. 8 in. (2.94 m.)
Length ...	43 ft. 3 in. (12.9 m.)
Track ...	13 ft. 8 in. (4.16 m.)
Mean chord of wing ...	8 ft. 4 in. (2.54 m.)
WEIGHTS	
Tare weight ...	4,826 lb. (2,189 kg.)
Crew (three with parachutes) ...	600 lb. (272 kg.)
Fuel and oil ...	1,005 lb. (456 kg.)
Maximum military load ...	1,219 lb. (553 kg.)
Maximum permissible gross weight ...	7,650 lb. (3,470 kg.)
PERFORMANCE	
Maximum speed at sea level ...	169 m.p.h. (272 km/h.)
Maximum speed at 6,000 ft. (1,828 m.) ...	188 m.p.h. (302 km/h.)
Cruising speed at 6,000 ft. ...	160 m.p.h. (257 km/h.)
Stalling speed ...	66 m.p.h. (106 km/h.)
Rate of climb at sea level ...	750 ft./min. (3.81 m/sec.)
Rate of climb at 6,000 ft. (1,828 m.) ...	850 ft./min. (4.32 m/sec.)
Service ceiling ...	19,500 ft. (5,944 m.)
Absolute ceiling ...	21,000 ft. (6,400 m.)

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —



FOR THE PACIFIC SERVICE: The Martin China Clipper at Baltimore before its first passenger flight as a unit in the Pan American fleet

THE WEEK AT CROYDON

Looking Down at Discomfort : A Charter Pilot's Charter : Flying Snacks : The Airport on the Air

REMEMBERING the time of the year and the recent gales which upset most forms of transport except flying, we have had an exceptionally good week at Croydon, and several companies, notably K.L.M. on the Scandi-avia and Berlin lines, have been compelled to duplicate services.

I met a man recently who, fearing a bumpy crossing from Holland, took the night boat instead of the afternoon machine from Amsterdam. He endured a night of exquisite misery, whereas a friend of his, who was wise enough to fly, looked down on troubled waters from a height at which travel was the steadiest imaginable. Incidentally, the boat traveller spent a day in bed after his buffeting, whereas his friend, like many another air traveller, found the journey a positive tonic.

During the gales Capt. Jimmy Youell made a remarkably fast trip to Brussels in a D.H.86 with nine passengers. His time was 1 hr. 17 min. On the same day Mr. "Pat" Hattersley, of British Continental Airways, broke the London-Lille record with a flight of 1 hr. 50 min. That enterprising company had the honour (as well as the publicity) of carrying "Miss England" to Lille, a job which more than one impressionable bystander envied the pilot.

Our old friend Mr. "Bill" Ledlie, after taking a spot of leave after strenuous flying activities with Olley Air Service, returned in style. He hired an air taxi to bring him back to duty at Croydon. Only the best is good enough for an air taxi pilot, so "Bill" had a MacRobertson pilot, Mr. Walter, to fly him. It must have been fun to sit back and see things from the special charter clients' point of view.

One day last week a K.L.M. service Douglas was flown all the way from Croydon to Amsterdam by the automatic pilot. The human pilot was, of course, in attendance in case "George" sneezed.

How air transport makes life worth while to Danes in London and to English lovers of the admirable Danish "snacks," which are a meal in themselves, is illustrated by the arrange-

ment recently come to between the K.L.M./A.B.A. and the May Fair Hotel for the importation of rare and refreshing delicacies unobtainable in England. The May Fair Hotel has opened a "Danish Snack Bar," which should be worth a visit. At all events you will know that the food you eat only left its native Denmark the same morning.

I understand from Air France that the London-Cannes service will be in operation once more from December 1, since the Municipality has seen reason in the matter of extending the airport of Cannes.

A Dog's Life

At the Croydon Police Court last Saturday Mrs. Roy Fox, the wife of the popular band leader, was fined forty shillings and K.L.M. was fined £5 for the illegal importation of a small dog by air without the necessary import licence. The fine nobody can grumble at, because a technical offence was admittedly committed, but the company was stigmatised by the magistrates as negligent. No opportunity occurred to bring full evidence to prove that the most elaborate precautions are taken by K.L.M. and other companies to prevent such an unforeseen occurrence.

It is, of course, right that the Board of Agriculture should take a serious view of infringements of the law which is designed to prevent the introduction of rabies into this country, but there is said to be reason in all things, and it would appear that the Dutch company has reason to feel aggrieved at being judged negligent in this case. When dutiable articles are brought into this country it is the owner, not the carrying company, who stands the racket.

There was a thoroughly interesting educational half-hour's broadcast from Croydon last Friday when the Control Tower (Uncle Jimmy Jeffs) conversed with Uncle O. P. Jones, who spoke from a D.H.86 on the tarmac. Incidental noises—one of them a startling bang—were provided by the arrival of a large air liner alongside the smaller machine which O. P. Jones was about to take off.

A. VIATOR.

Commercial Aviation

The Douglas in Service

ON October 9 the twelve Douglas D.C.2s used by K.L.M. had flown 6,034 hours, and one, *Koetlang*, had made six return journeys to Batavia.

Incidentally, the Douglas used by Avio Linee Italiane on the service between Milan and Rome has been averaging something like 172 m.p.h., and 72.02 per cent. of the seating accommodation has been filled since August 31.

Record Testing

THE *China Clipper*, as the new Martin boat is named, should now have been launched on a series of technical flights at Baltimore and on the Caribbean, which must be completed before the boat is flown over to the Pacific seaboard. The final flight in the initial trials required a take-off and climb to a height of 16,000 ft. with a gross load of 51,000 lb.—a performance which, if successful, will have broken a number of world's records. The *China Clipper* is commanded by Mr. E. C. Musick, who took the S.42 across the Pacific on its first long-distance flights over the actual route.

According to the plans the new boat will now have been flown from New York to Miami for range tests in the Caribbean. These tests include flying 1,000, 2,000 and 3,000 miles non-stop, day and night, with full loads. The two sister ships will be delivered to P.A.A. within the next month.

The Channel Accident

AS a result of his investigation, the Inspector of Accidents has come to the following conclusions concerning the loss of the Wessex belonging to Cobham Air Routes when flying between Guernsey and Bournemouth on July 3:

(a) That the aeroplane was forced down into the sea by reason of engine failure, a complete breakdown of the starboard wing engine occurring some 25-30 minutes after the start of the flight, and this being followed in the course of the next half-hour by a loss of power output from one or possibly both the other two engines. (b) That in view of the fact that the machine and pilot were lost at sea, it is obviously impossible to arrive at any definite conclusions as to how or why the engines failed. There are, however, some grounds for a belief that breakage of the induction fan occurred in the case of the starboard engine, and that the other two engines eventually lost power through overheating. (c) That the pilot's failure to execute a successful forced landing on the water may well have been due to the passenger's last moment action in moving from the front to the back of the cabin and thus very appreciably altering the trim of the machine at the critical moment. (d) That the pilot took an unnecessary but not wholly unjustifiable risk in attempting to complete the sea passage on only two engines; his safest course of action would have been to have turned down-wind and headed for the French coast.

Lorenz System for Heston

THE successful development in Germany of the Lorenz blind landing system—described in *Flight* of February 14 this year—coupled with the obvious need of a standardised type of approach beacon for use at all international aerodromes, is leading to the rapid adoption of this system for Europe. Installations are either planned or already completed at Paris, Vienna, Zurich, Copenhagen, Moscow, Warsaw, Malmo, Oslo, Rotterdam, Danzig, Berlin, and nine other towns in Germany, while over fifty passenger machines of Deutsche Luft Hansa have been equipped with the necessary receiving apparatus.

Heston will be the first British airport to be equipped with the Lorenz apparatus. It is to be installed immediately by Standard Telephones and Cables, Ltd. (who own the British rights) in accordance with plans prepared by Mr. Roderick Denman, Technical Director of Airwork, Ltd., in collaboration with Messrs. Norman, Muntz and Dawbarn, the architects for Heston. As initially installed, the system is expected to provide a satisfactory proof of its ability to facilitate the approach and landing of aeroplanes in conditions of bad visibility. Later modifications are contemplated which should permit of wholly blind landings being carried out if required.

The new night service of United Airways, in conjunction with their Belfast and Liverpool extensions, has been running to schedule with satisfactory loads, averaging about four passengers. Since Liverpool and Belfast were brought into the time-tables bookings have been almost doubled. The regular night landing by United Airways pilots necessitates rather more precise meteorological data than are obtainable by the unassisted eye. The Air Ministry has therefore supplied hydrogen balloon apparatus for determining the height of clouds, and this should be in action at Heston this week.

The New Imperial Fleet

SOME idea of the full extent of the re-equipment taking place within the expansion scheme planned by Imperial Airways, Ltd., can be gained from the fact that no fewer than twelve big Armstrong-Whitworth monoplanes have now been registered in addition to the comparatively large number of flying boats which are on the stocks.

Very little is, of course, known about the A.W. XXVIs save that they may be considered as scaled-up Atalantas with four Armstrong Siddeley Tigers and retractable undercarriages. From what one hears, the passenger and mail accommodation will be comparable with that of the new Short boats which were described in *Flight* of September 26.

Co-operation

AN important announcement has been made by the Directors of British Continental Airways, Ltd., concerning an agreement which has been reached between that company and the Royal Dutch Air Lines (K.L.M.) of Holland. British Continental Airways, will, as already announced in *Flight*, start a daily service between London and Amsterdam via Antwerp on November 1, and the K.L.M. will act as head agents to the British company in the Netherlands.

B.C.A., therefore, will take advantage of the existing and very complete organisation of the Dutch company for the handling of passengers and freight, and in every other respect the K.L.M. organisation will be at their disposal in Holland.

At Croydon it is understood that there will be close co-operation between the two companies and all freight clearance, delivery and collection will be undertaken by the K.L.M. The agreement which has been reached will be beneficial to both parties and amongst other things it absolutely precludes all price-cutting on the London-Amsterdam line. Anyone aware of the confusion which price cutting has caused on other Continental routes will realise the immense importance of this point.

Companies which are members of the I.A.T.A. may not act as agents for others who are not yet members so that, normally, K.L.M. could not have entered into an agreement with B.C.A. This rule, however, does not hold good in the case of affiliated companies and it is understood that affiliation was arranged at a recent meeting in the Hague between Mr. "Fairey" Jones, Managing Director of B.C.A., and the Directors of K.L.M. Capt. Spry Leverton and Mr. C. E. Kauffmann, representing the K.L.M. in England, were also present at the meeting.

From Newtownards

A TOTAL of 447 air line passengers passed through the Ards Airport in September. The total for August was 484 and for July 442. Although a seasonal decrease is natural at this time of year, it is interesting to see that the September figure, though below the August total, is still above that of July.

The event of the present month has been the commencement, on October 7, of United Airways' thrice-weekly extension to Belfast in conjunction with Hillman's Airways. This means that on Mondays, Thursdays and Saturdays passengers who cannot catch the nine o'clock Hillman from Newtownards may take the 14.40 connecting at the Isle of Man with United Airways to Heston. If you miss the 14.40 from The Ards, which stops at the Isle of Man, Blackpool and Liverpool (or if you simply want to save three-quarters of an hour) you can take the 15.25 which goes non-stop to Liverpool. There you change to the same United aeroplane which you would otherwise have transferred to in the Isle of Man. You reach Heston, as you intended, at 18.10.

The northward journey is differently timed and involves no night flying. United's leave Heston at 12.45. At Liverpool the passenger changes to a Hillman's machine, which reaches Belfast at 15.30. Appropriate connections serve Blackpool, the Isle of Man and Glasgow.

Spells of high wind have harassed airline pilots throughout the last four weeks. A Blackpool and West Coast Dragon, piloted by Mr. Iain Ramsey, probably put up a record in its class one day when it reached the Isle of Man from Newtownards in fifteen minutes.

The story has come to light of a Hillman pilot who, not having been on the northern route for several days, suddenly espied the *Letitia* on the rocks at Donaghadee. Greatly excited, he radioed the news to Air Ministry, to be politely thanked and informed that the matter was well in hand as the vessel had been there for four days.

FROM the PASSENGER'S ANGLE

Written by a Normal Business User of Air Services, This Article Raises Several Points Which Are Likely to be of Interest to Operators



REGULAR advertising, the judicious use of slogans, and, in fact, all the wiles of the leading air transport companies' publicity departments have helped towards making the naturally apprehensive public believe that flying is the only means of swift travel. I say "helped" advisedly, because no amount of concentrated persuasion will convince some people. Figures prove that more and more people are travelling by air, but is everything quite as it should be?

As one whose business has necessitated quite a number of visits by air to Central Europe during the course of the past three years, I feel that the criticisms I have to offer are not altogether ill-founded. I have flown in many different types of machine and, on a comparative basis, I must frankly say that some of them have been sadly wanting. It has led me to wonder if some of the designers have ever travelled in company with members of the ordinary travelling public on service runs.

No one, I think, will deny that at least fifty per cent. of the people travelling by air to-day are on business bent. My own humble experience has led me to believe that the number is considerably greater. Now business folk, more often than not, have to work to a schedule. Time is everything; that is one of the reasons why they use the air. I, too, have to work to a schedule which sometimes has to be worked out at the last minute. But for me it is the return journey that is most important.

The Booking Problem

If I go to an air company's office in London to book a return flight to some Continental destination I find that no special arrangements are made for quick return reservations. The office may know during the course of the following day whether a seat is available. Alternatively, I can pay the cost of a reply-paid cable or even of a long-distance telephone call—which, when my fare is possibly in the region of twenty pounds, appears to be rather in the nature of an insult. I suppose the day will come when the airports will be linked by wireless so that the various companies' urgent business—and I consider the matter of booking tickets urgent enough—will be settled with the aid of more up-to-date methods.

Another small but nevertheless irritating point in connection with the booking side makes me ask, "Is it absolutely necessary to carry the bulky wad of tickets which are issued to us for even the shortest of journeys?" The book of tickets is invariably too bulky to slip into my wallet, too long for my hip pocket, and is generally awkward.

As I have already said, business people need to work to a schedule, and so do the majority of air companies. In consequence, it is frequently amusing to spend an evening, say, at Croydon, watching machines slinking in fifteen or thirty minutes or even hours late. It makes me believe that air schedules are based on fine-weather cruising speeds. Head winds must, I realise, play havoc with schedules, but would it not be far better to base time-tables on bad-weather speeds so that for the most part the machines arrive early? I know of several services which regularly arrive early—giving a pleasant surprise to the passengers—largely because they are fast machines working on a slow schedule. Little is lost by arriving early, but a lot might depend on arriving on time. I earnestly hope that when the slow machines are superannuated the time-tables will not be tightened up too firmly. The passenger, we are told, must be made to feel at home in the air and must be given a feeling of solidity and security.

It is an admirable idea within certain limits. But I maintain that with some passenger aircraft this theme has been carried too far. I am convinced, for instance, that there is a great deal that can be done to prevent air sickness. As with sea sickness, air sickness is a partially nervous complaint and is frequently sympathetic. I have noticed that passengers sometimes begin to suffer when taxiing across a rough aerodrome in a machine in which much of the seating accommodation extends well forward of the wheels, so that the unfortunate occupants were levered up and down to an incredible extent by the bumps.

Uncomfortable Facts

When will the air companies seriously tackle this question of air sickness? In my journeys I have noticed one or two little points which I think have a psychological reaction upon the nervous passenger. Let me take, for example, the really big machine in which the passengers sit three abreast, six to a table. It is wider, perhaps, than a Pullman car, but a Pullman does not yaw from side to side, or bump up and down in a series of inconsequential leaps and bounds. Passengers sitting on the inside can either look out of the window and see the horizon occasionally heaving up and down, with, if they are lucky, a glimpse of the wing tips violently accelerating and decelerating across the horizon, or obtain an admirable close-up of their opposite number across the table, who may be in the throes of sickness. If the unfortunate one has the strength, he retires at the critical moment or moments—otherwise the steward must come to the rescue with charming little papier-mâché buckets.

On the other hand I have made many trips in sixteen-seaters in which each passenger has a window to himself, and all face forward. On several occasions the weather has been bad, yet I have never seen anyone succumb, and in any case the high-backed seats act as effective screens.

Restorative Air

Possibly aircraft designers never feel ill, but those less fortunate members of the travelling public appreciate a blast of cold air on the face. It is rather extraordinary that on the big machines the only restorative blasts of air are for the benefit of the occupants of the window seats—who least require it. Last year I travelled in a machine equipped with flexible ventilation tubes for each passenger. It could be used as required without causing discomfort to other passengers. It is difficult to please everyone.

There is one little but, nevertheless, important point worth considering, and that concerns descents from high altitudes. Now that machines are flying regularly at more than 10,000ft. passengers should surely be told how to relieve the increasing air pressure on their eardrums. Cards, printed in various languages, telling them to swallow and, if possible, to yawn would be sufficient, and these might be distributed just prior to the descent. We are occasionally offered chewing gum, with an accompanying wad of cotton wool, but during the thrill (or anxiety) of the descent one is apt to cease chewing and swallowing. Once this year I was flopped down from 15,000ft. in less than ten minutes. There was no warning and more than one passenger was seen to be writhing in his seat with both hands held to his ears. Then, on the other hand, on an internal British air service, I once spent half an hour

Commercial Aviation

coming down from 10,500ft. The pilot handed back some hard sweets, with strict injunctions to swallow regularly, and gave the reasons why. Occasionally he looked round to see that we blew our noses and were carrying out his instructions. This sort of thing goes down well with passengers.

Incidentally, it is hardly encouraging for the nervous passenger to listen to the crashing and banging which goes on when the undercarriage makes contact with the usually uneven surface of an aerodrome. Is it entirely beyond designers here to evolve a really efficient undercarriage which, at the same

time, is quiet and smooth? I know of one sixteen-seater which can land and taxi over the average field in comparative silence and, what is more, it rides the bumps as if it were a luxury car on a main road.

These criticisms must not be looked upon as an attack upon modern air travel. As long as it is possible for me to do so, I, in company with the ever-increasing thousands, will travel by air. But I do feel that there is an opportunity for improvement in one or two of the small points I have raised.

C. R. H.

A Northern Increase

THE traffic returns at Manchester Airport show that 323 passengers have passed through during September of this year against 85 for the same month last year. The fact that the number of machines using Barton only increased from 123 to 196 suggests that more people are using the air lines.

Permutations and Combinations

ALTHOUGH vitally interesting only to radio operators, "Abbreviations to be used in the Civil Aeronautical Radio Service," recently published by H.M. Stationery Office, gives the layman at least some indication of the number of possible variations using only two letters. The letter X is a difficult one for the inventor of a phonetic alphabet, but how is "Xanthippe" pronounced?

Ramsgate Extensions

THE ninety-acre aerodrome at Ramsgate is likely to be extended on the west side in the near future. Buildings are to be erected during the winter, these comprising an all-steel hangar, a control tower, offices and a restaurant, and placed in the S.W. peninsula.

Mr. Ronald Clarke, F.R.H.S., who is in charge of the development, feels very happy about it inasmuch as the Air Ministry Inspector, Capt. Stack, of Hillmans, and Sir Alan Cobham's display people have said that the surface was the finest of any aerodrome in the country.

Air Mail

A NEW edition of the Post Office air mail leaflet has recently been issued. Business people cannot be reminded too often that the Indian and the East Indian air mail is dispatched on Tuesday as well as on Saturday.

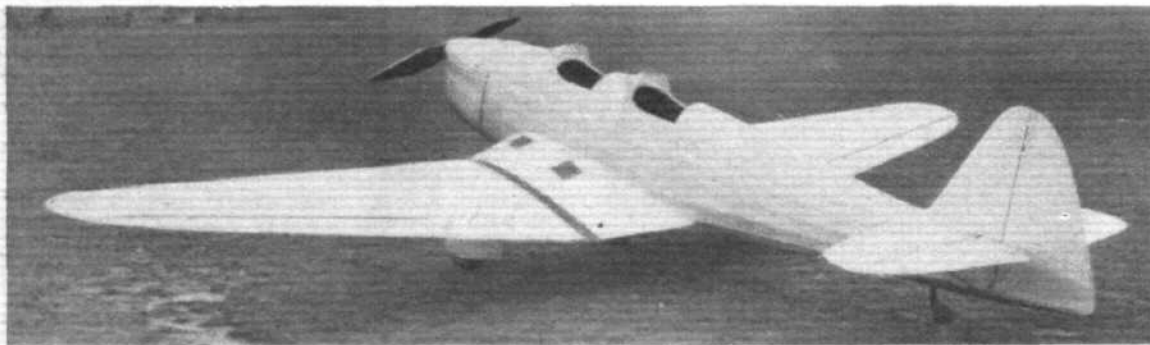
Luggage Express

THE time-table for the Air Dispatch Dawn Express has been slightly altered since daylight saving ceased, the service now starting fifteen minutes later. It is, incidentally, becoming well known as a baggage carrier. In addition to the regular freight, no less than 2,000lb. of personal luggage was carried this week for travellers who have discovered that it is actually cheaper to send their luggage by air than by boat and rail.

Commercial Air Hire, Ltd., has been so rushed with special charter work lately that they have been forced to buy a third D.H. Dragon and take on another pilot. Mr. Bottel-Gill, late of Provincial Airways, has joined his two companions, Mr. Scott and Mr. Jackson, also former Provincial Airways pilots. Last week the firm did a rush trip to Paris for General Critchley, the President of the Greyhound Racing Association, who had urgent appointments which could not be delayed. Within a few minutes of receiving the booking order Mr. Eric Noddings was ready to leave and the General kept his appointments.

A NEW GERMAN TWO-SEATER

The Klemm Kl.35 : An Open-cockpit Touring Aeroplane With Full Aerobatic Factors



Downswept wing roots are the most noticeable innovation in the latest German Klemm.

SHOWN to the general public for the first time at the Milan Aero Show, the Klemm Kl.35 departs both in its general form and in the details of its structure from the machines which have made the name Klemm famous. It does, however, remain true to Dr. Klemm's original ideal of a low-wing cantilever monoplane, a type which he has done much to popularise, and which has now, more than ten years afterwards, come to be a very common type.

Changes in general design immediately noticeable are the downswep wing roots and the cantilever undercarriage. The reason for the former is probably that of obtaining "open" angles at the junction of the wing roots and the fuselage, thereby reducing the amount of interference without the use of large "fillets." Another advantage of the arrangement is that the ground angle of the machine is increased without increasing the length of the undercarriage legs. Thus it has become possible to adopt a cantilever type of leg of reasonably low weight. The leg, by the way, is designed for sinking speeds of as high as 9.2 ft./sec.

Structurally the Klemm Kl.35 is chiefly noteworthy for the

fact that the fuselage is a steel tube girder of oval cross-section with fabric covering.

The two cockpits are arranged in tandem in the usual way, but it is claimed that the view is considerably improved by dropping the wing as previously described.

Large-span ailerons are fitted, but trailing-edge flaps are, apparently, not used. The only concession to Dame Fashion is to be found in the "tabs" on the elevator trailing edge, which take the place of a trimming tailplane. All flying controls are carried on ball bearings.

A Hirth H.M. 60 R engine of 70-80 h.p. is fitted in the prototype machine, but we are informed that the production model may have an engine of about 100 h.p.

The main data relating to the first model are as follows: wing area, 163 sq. ft.; weight empty, 870 lb.; disposable load, 605 lb.; loaded weight, 1,475 lb.; wing loading, 9 lb./sq. ft.; max. speed, 118 m.p.h.; cruising speed, 108 m.p.h.; landing speed, 45 m.p.h.; range, 500 miles; climb to 3,300 ft., 6.5 min.

A batch of production machines is to be laid down shortly at the Böblingen (Württemberg) works of Leichtflugzeugbau Klemm G.m.b.H. so that the machine should be on the market in a few months.

SQUADRON LIFE

*Being a Third Instalment of the
Story of a Newly Commissioned
R.A.F. Officer's Day-to-day
Existence*

By Ex-Pilot Officer F. W. RICHARDS



I ARRIVED at Horpachurch in a taxi of pre-war vintage, with a fierce driver, who, when attaining the maximum speed of some 15 m.p.h. of which the vehicle was capable, gave the impression by his facial contortions that he was driving Sir Malcolm Campbell's *Blue Bird* on the sands of Daytona.

I entered the Mess, and found one Flight Lieutenant asleep on a sofa. He awoke as I came in, and the following conversation took place:—

"Have you come to see to the new decorations for the Mess?"

"No, to join No. 111 Squadron, Sir."

"Don't call me 'Sir' off duty."

"No, Sir."

"Anyway, you'd better go away again, because both squadrons are on leave, and will continue to be on leave for another fortnight."

"I haven't any money—I've just had a month's leave."

"Nor have I; that's why I'm left here in solitary grandeur as Duty Station Officer, Orderly Officer, and Duty Pilot"—adding, at the top of his voice, "Bullen, bring two pints."

This conversation left me with a somewhat dazed feeling and a pint of excellent beer. At an F.T.S. one treats a Flight Lieutenant as a being as far above one as Royalty above a kitchen-maid; but here, apparently, although one treated them with due respect during working hours, they were just ordinary human beings at other times.

Things Begin to Happen

So, with Flight Lieutenant T—I and two other new arrivals spent a somewhat dreary fortnight waiting for the squadron to return from leave. Then things began to happen.

The year's work of a home defence unit, I discovered, is divided into three parts—Individual Training, Flight Training, and Squadron Training. The names explain themselves. At the end of the first period the new arrivals have to undergo exams., which no one, with the possible but not probable exception of the hero who sets the papers, treats very seriously.

The principal ingredients of the flying side of the Individual period, as far as fighters are concerned, are wire-

less telegraphy, air pilotage, camera gun attacks, firing on ranges from the air, and low bombing.

The Flight Training period consists of much the same things done with the whole flight together; for instance, converging bombing is practised instead of individual bombing. This is definitely more amusing.

One morning I arrived at my flight office, and found Flight Lieutenant S—, my Flight Commander, holding in his hand a large sheaf of documents tied up in red (yes, really red) tape, and on the cover was written "Strictly Confidential." There was nothing new about this, for nearly everything one sees when in Government employ is supposed to be confidential, but this package looked something out of the ordinary; and the Flight Commander, who is the most conscientious man I have ever met, handled it as if it were bar gold. Then he said, in a sibilant whisper: "Orders for squadron attacks; learn them, and then lock them in my desk."

I have often wondered how many spies each nation has in the services of every other nation, and thought how unconfidential these things may be.

Suicide on Paper

However, I opened the thing, and looked at the first attack. It was a picture of a squadron of bombers, and behind them a squadron of fighters. Dotted lines issued from the noses of each fighter, thereafter mingling into an astounding muddle, resembling a ball of string that a puppy has been dealing with for an hour or so, and eventually emerging indiscriminately behind the bombers in an attacking position. I gasped. Then I sat down, and, after half an hour's hard work with a very sharp pencil discovered the route I was expected to fly before eventually reaching my target.

On paper a squadron attack is the most suicidal scheme I have ever witnessed, but in practice it quite often becomes feasible.

Summing up life in the R.A.F., I think one can safely say that anyone who affirms that school days are the happiest in his life has never been in the R.A.F.; and anyone who says that days spent in prison are the most unpleasant he has ever encountered, has never experienced prosaic commercial life after leaving the R.A.F.

PRACTICAL DIARIES

THE beginning of a new year is not far distant, and it is not too early to be thinking of the subjects of diaries. Three quite out-of-the-ordinary pocket diaries are those published, respectively, in conjunction with our associated journals, *The Autocar*, *The Motor Cycle* and *The Wireless World*. Each one contains a large amount of information of value to the enthusiast for each particular subject. For example, *The Autocar* diary for 1936 contains new particulars of race regulations at Brooklands and Montlhéry, and detailed information in the form of track speed, distance and r.p.m. tables, including an entirely new lap speed table for the famous Nürburg ring course. There are, in addition, the usual practical features, such as "famous hills"—revised—racing and

trials results, tyre interchangeability tables, sparking plug details, etc.

Similar features, though specially applicable to motor cycles, are found in *The Motor Cycle* diary, among the features of which is a maintenance log.

The Wireless World diary includes information of use to the wireless set builder and experimenter; there are fourteen pages of up-to-date circuit diagrams and a nineteen-page list of valve data covering every important valve at present on the market.

Each of these three diaries is published at 1s. 6d., and is obtainable from any bookseller, or from Iliffe and Sons Ltd., Dorset House, Stamford Street, London, S.E.1.

THE INDUSTRY

Expansion

LODGE PLUGS, LTD., of Rugby, are making extensions to their machine shops which will almost double the size of the existing factory. Employment will be provided for many more hands.

Mr. M. Langley Goes to B.A.

AFTER an absence of several years, during which time he has been a lecturer at the De Havilland Technical School, Mr. M. Langley is returning to active aircraft production as assistant designer to Mr. G. H. Handasyde with the British Aircraft Manufacturing Co., Ltd., at Hanworth. In taking over his new post on November 1 Mr. Langley is actually resuming an interrupted partnership, for he was associated with Mr. Handasyde in the production of the Desoutter monoplanes some years ago.

Short Bros. Share Introduction

SHORT BROTHERS (Rochester and Bedford), Ltd., have recently been converted into a public company with an issued and paid-up capital of £150,000 in 250,000 "A" ordinary and 350,000 ordinary shares of 5s. each. According to a statement published last Tuesday "for information only," Erlangers, Ltd., have agreed to acquire 250,000 5s. ordinary shares at 23s. 4d. a share, together with options exercisable up to April 17, 1937, on 37,500 shares at 25s. each and 37,500 at 27s. 6d. each.

Hawker-Siddeley Progress

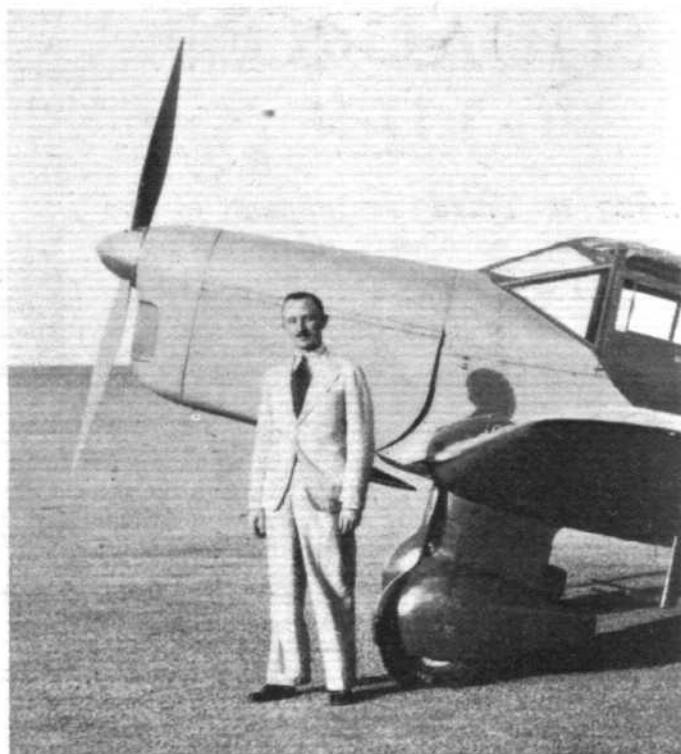
AT the statutory meeting of the Hawker-Siddeley Aircraft Company, Ltd., held in London last week, the chairman (Mr. T. O. M. Sopwith) said that although only three months had passed since the formation of the company, the period had been one of great activity; all the companies they controlled were working with the maximum number of hands which could be efficiently employed; expansion was taking place and the number of hands being increased each month.

The estimate of Sir John Siddeley when the company was formed that the profits of the Siddeley group would exceed £300,000 for the year 1934-35 had been fulfilled.

The Weyburn Issue

THE lists opened last Monday for the issue of 120,000 6 per cent. cumulative preference shares of 10s. each at par and 160,000 5s. ordinary shares at 6s. 3d. per share in the Weyburn Engineering Co., Ltd., which has been formed to acquire the well-known Weyburn engineering concern at Elstead, Surrey, manufacturers of precision components for the aircraft and other industries.

The preference capital is covered one and three-quarter times by the net assets. Profits for the year ended October 31, 1934, were £11,112, covering the preference dividend over three times and showing earnings of over 16 per cent. on the ordinary capital. For the first eight months of this year earnings were at the rate of £13,695.



OPENING UP AFRICA. Mr. K. W. Brett, who set off from Cairo last Sunday in the Shell company's Percival Gull (seen in the photograph) for a six weeks' tour of Africa. He is to carry out preliminary survey work for aircraft refuelling stations in various parts of Africa, including those on the probable track of the West African Imperial Airways service. In company with M. Vuillemin of the Shell Company in Algiers, he will also inspect sites for stations in the Sahara, Nigeria, and French Equatorial Africa.

PUBLICATIONS RECEIVED

Aeronautical Research Committee Reports and Memoranda, No. 1653: Static Stability Tests of Six Full Scale Twin Float Seaplanes. By R. K. Cushing, A. S. Crouch and R. W. Angell. Price 1s. 6d. No. 1657: *Water Performance of Seaplanes.* By W. G. A. Perring. Price 6d. No. 1662: *Turbulence Tests of the R.A.E. Wind Tunnels.* By R. G. Harris and A. Graham. Price 6d. H. M. Stationery Office, Kingsway, London, W.C.2.

NEW COMPANIES

FAIRBY CONSTRUCTION COMPANY LTD. Private company, registered October 14. Capital, £10,000 in £1 shares. Objects: To acquire the business of a specialist in aircraft buildings now carried on by Geo. H. Humphrey at Africa Hse., Kingsway, W.C., as "Fairby Construction Co.". First directors are to be appointed by the subscribers. Secretary: W. M. Nicol. Registered office: Africa Hse., Kingsway, London, W.C.2.

ANDERSON AEROCARS LTD. Private company, registered October 15. Capital, £10,000 in £1 shares. Objects: To manufacture and deal in aeroplanes, seaplanes, floats, canoes, motor-boats and aircraft of all kinds, etc. Permanent directors: Jas. M. King, "McEwan," Point Rd., Canvey Island, Essex. (director of Galbraith King and Co. Ltd., and Jubilee Air Displays Ltd.); Lionel J. Anderson, 39, Eaton Rise, Ealing, London, W.5. Registered office: 61, Crutched Friars, London, E.C.3.



REVIVALISTS: The Phoenix, described on pages 436a-437 of this issue, was produced by the team work of the members of the Heston Aircraft Co., Ltd., seen in this group. From left to right: B. R. S. Jones (director), George Cornwall (chief designer), Edmund Hordern (test pilot), G. A. Lingham (director), Stanley Evans (assistant designer), and Jack Graham (works manager). (Flight photograph).